# SUMMARY OF PHASE I

# PHASE II PROGRAMS

# PHOENIX GOODYEAR AIRPORT

JUNE 1991

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ICF TECHNOLOGY INCORPORATED



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### PHOENIX-GOODYEAR AIRPORT

# PHASE II PILOT HOLE BORING PROGRAM

#### 1.1 INTRODUCTION

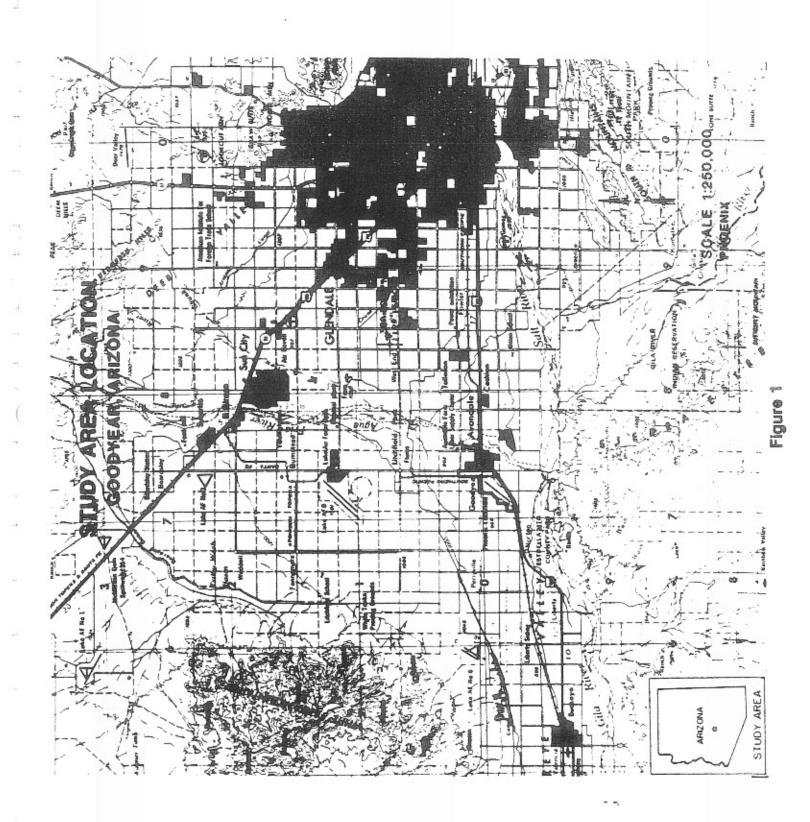
The Phoenix-Goodyear Airport (PGA) Superfund site is located approximately 20 miles west of Phoenix, Arizona, in Township One North, Range One West, of the Gila and Salt River Baseline and Meridian (See Figure 1 for Study Area Location Map and Figure 2 for Site Location of PGA). The site, which encompasses an area of approximately 25 square miles, is within the jurisdictions of the cities of Goodyear, Avondale, and Phoenix. Investigations at the PGA site, which began in the early 1980s revealed that the soil and groundwater at the site were contaminated with volatile chlorinated solvents, including trichloroethylene (TCE), 1,1-dichloroethylene (DCE) and tetrachloroethylene (PCE), and chromium (Ecology and Environment, 1986; Engineering-Science, 1988; CH2M Hill, 1988). In September 1983, EPA added the PGA site to the National Priorities List. Subsequently, a remedial investigation (RI) was initiated under the federal Superfund program (Ecology and Environment, 1986). The RI characterized the site, identified potential sources of chemicals in the aquifer, and identified possible clean-up solutions for the site.

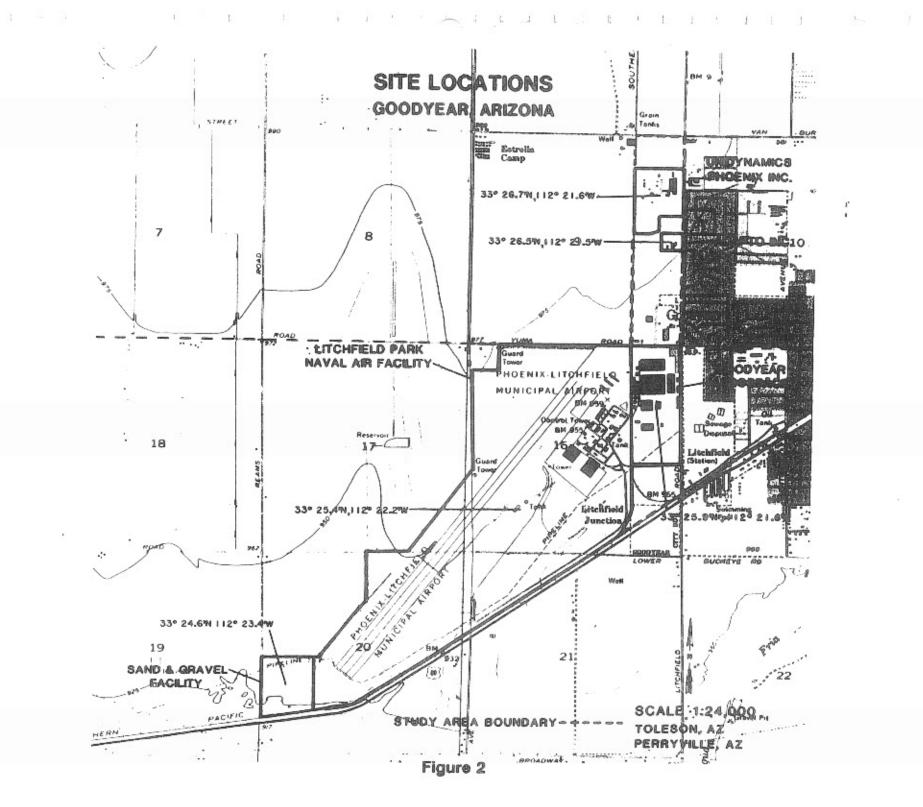
A feasibility study evaluated various alternatives for the cleanup of Section 16 at the PGA site. This section in the southern portion of the site and includes the Loral Corporation facility (formerly owned by Goodyear Aerospace Corporation) and the Phoenix-Goodyear Airport (formerly owned and operated by the U.S. Navy). The recommended treatment plan consisted of pumping the water from the aquifer, removing the volatile organics from the water by air stripping, and reinjecting the treated water into the aquifer. On September 29, 1987, the U.S. Environmental Protection Agency issued a Record of Decision specifying a separate operable unit remedy for the clean-up of Section 16 at the site (EPA, 1987).

In August 1988, Goodyear conducted a pilot plant test of the air stripping and groundwater recharge system in Section 16. Based on the results of the pilot test and groundwater modeling, a full-scale treatment system was designed for the restoration of groundwater. The final design was presented in the Final Draft Design and Specifications, PGA Operable Unit Treatment Plant (ICF, 1989). The proposed treatment system will withdraw water from the aquifer with 10 extraction wells, remove volatile organics by air stripping, and recharge the treated water into the aquifer with 11 injection wells. The treatment will be implemented in two phases over a period of two years. During Phase I, five extraction and five injection wells will be installed. During Phase II, the remaining five extraction wells and six injection wells will be installed. The system will treat groundwater at 1,200 gallons per minute (gpm) and will be operated for approximately 20 years.

### 1.2 SUMMARY OF PHASE I PROGRAM

ICF Technology Inc.(ICF) conducted well drilling and aquifer testing at the Phoenix-Goodyear Airport from March through July 1989. This work was performed in accordance with the consent





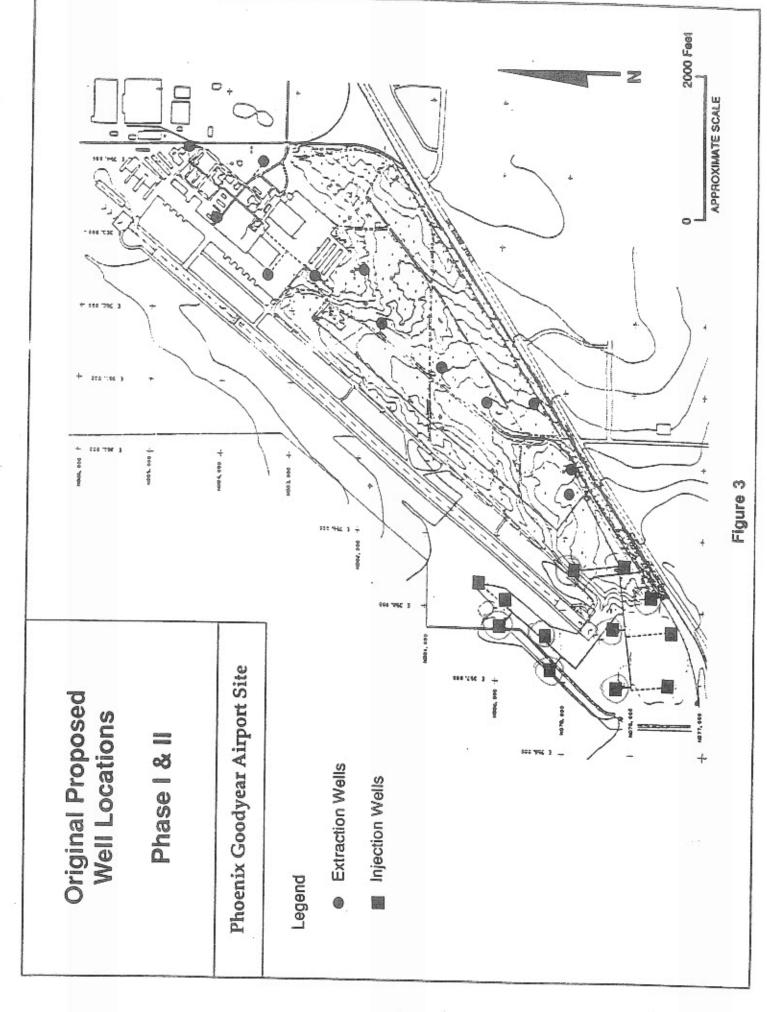
order signed by the Goodyear Tire and Rubber Company and the EPA under Task 104 of ICF's contract with Goodyear.

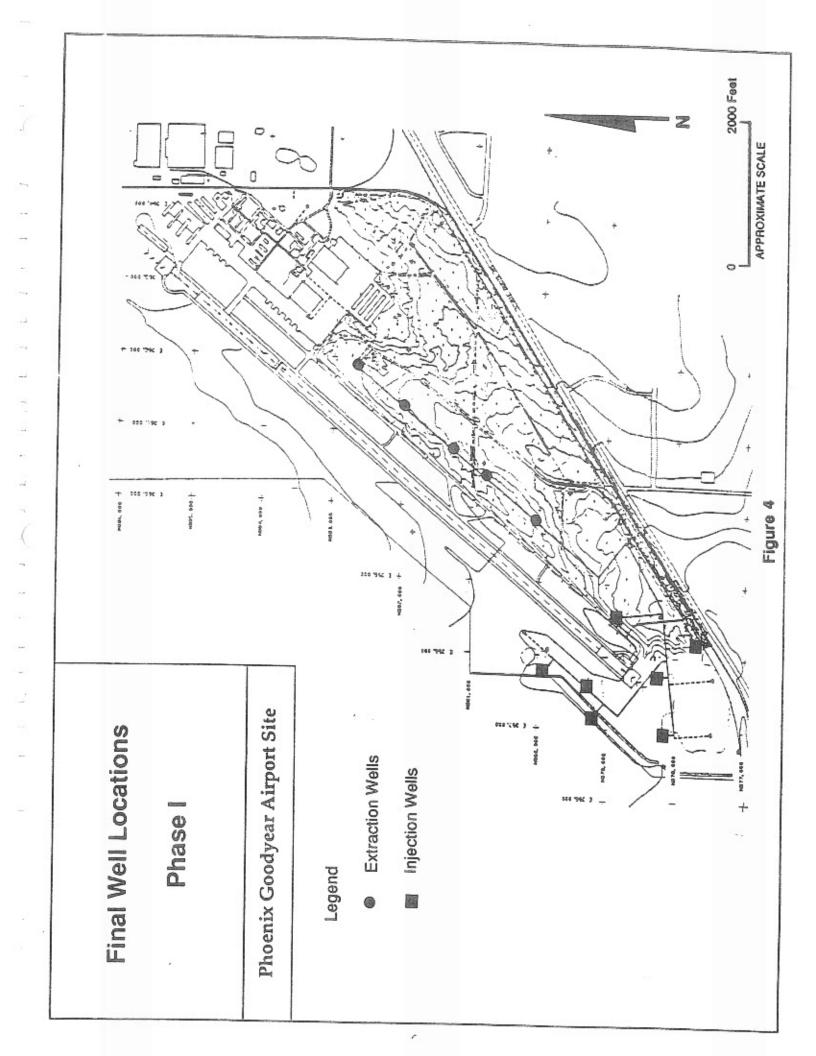
Drilling, well installation, well development, and aquifer testing were performed by Beylik Drilling Inc. of La Habra, California under the supervision of ICF geologists. Chemical laboratory analysis were performed by Analytical Technologies Inc. of Tempe, Arizona, and sieve analyses were performed by Sergent, Hauskins, and Beckwith of Phoenix, Arizona.

ICF began drilling and well installation in March 1989. A total of four monitoring wells (NEW-1 through NEW-4), seven extraction wells (E-1 through E-7), and 10 injection wells (I-1 through I-10) were included in the program plan (Figure 3 shows the locations of the original Phase I and II well locations). During the course of drilling extraction wells, ICF discovered that geological conditions were not favorable at the originally planned locations due to a high percentage of fine soils in the saturated interval of Subunit A. One of the extraction wells (E-3) was completed as planned except that the depth was increased; another (E-4) was converted to a four-inch PVC monitoring well; and one (E-7) was drilled, but then abandoned without installing the casing or screen.

Following consolidation of all collected data, ICF and Goodyear met with the EPA to present the data and to request an extension of Consent Decree deadlines (which was granted). In addition, a revised plan was presented to the EPA that involved drilling five extraction wells (NE-1 through NE-5) at new locations. The locations of the injection wells were not changed, and seven of the original 11 injection wells were planned to be installed (I-1, I-3, I-4, I-6, I-8, I-9, and I-10). Also proposed as part of the revised program were test holes placed within 50 feet of the extraction/injection well locations, into which one-inch PVC piezometer/observation wells would be installed (Figure 4 illustrates the location of the Phase I extraction and injection). Soil samples were collected during the drilling of the test holes for logging purposes (to determine if conditions were favorable for well installation at those locations) and performing sieve/grain size analyses for well design (ICF, 1991).

The revised plan was approved by the EPA and was implemented starting with test hole drilling from May 15 to May 23, 1989, and continuing with extraction/ injection well drilling and aquifer testing from May 31 through July 3, 1989. The treatment plant was constructed and began operating in December 1989 under the direction of another consultant.





# 2.0 SITE GEOLOGY AND HYDROGEOLOGY; CONCLUSIONS FROM PHASE I AND PRE-EXISTING REPORTS

### 2.1 GEOLOGY

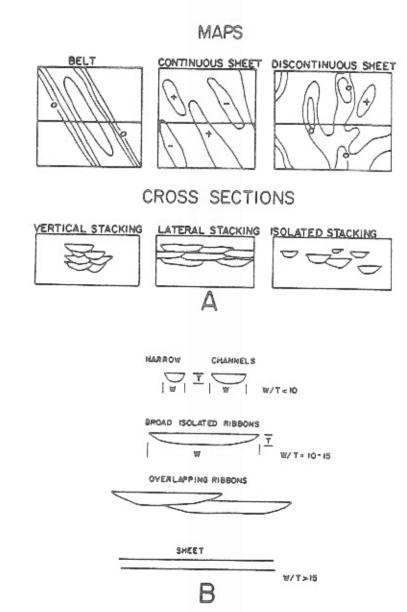
The Phase I program demonstrated the complex nature of the geology and hydrogeology at the PGA site. Geologic conditions (encountering fine grained sediments) resulted in modifications in locating the extraction and injection wells. Previous RI reports indicated that Subunit A of the Upper Alluvial Aquifer contained coarse sediments composed of predominantly gravel and sands deposited by the through-flowing Gila River system. While this description is true, sufficient detail was lacking in explaining the complexities of the fluvial depositional environment. The stratigraphic sequence of the fluvial depositional environment has direct bearing on the potential pathways for groundwater movement and contaminant transport.

Subunit A of the Upper Alluvial Aquifer is composed of sediments ranging from clay particles to gravel and boulder-size sediments. These sediments have been deposited by the current river systems (Agua Fria and the Gila River) during the past several million years. The river systems deposit sediments ranging in size from silts and clays (deposited laterally away from the channels in flood plains and overbank deposits) to sands and gravels (deposited in the stream channel or adjacent to the channels). As these stream channels migrate laterally and horizontally (through deposition), the stratigraphic sequence becomes complex, ultimately comprising numerous buried stream channels that are stacked vertically, offset horizontally, stacked laterally and that can be broad or very narrow in appearance (Figure 5 illustrates the principal types of fluvial reservoir geometries).

The alluvial drainage system in arid regions of the United States result from tectonic activity during which large blocks of the land surface are uplifted, creating mountain ranges. The areas between the mountain ranges are flat-lying basin regions where deposition occurs from sediments shed off the mountainous terrains. The deposition of sediments causes land subsidence in the basin areas, and ultimately thousands of feet of sediments can accumulate. As sediments are shed off mountainous regions, fan-shaped deposits of sediments called alluvial fans are formed. These fan-shaped depositional environments are created when streams flowing from mountains reach the flat lying basin areas, thus reducing the stream velocity and the carrying capacity. The coarser sediments are deposited first, and even further away from the source region, the finer sediments are deposited. Figure 6 illustrates a sedimentary facies and profile of arid-region alluvial fans while Figure 7 illustrates a hypothetical fluvial system from the source region to a delta.

### 2.2 DEPOSITIONAL HISTORY OF PGA SITE

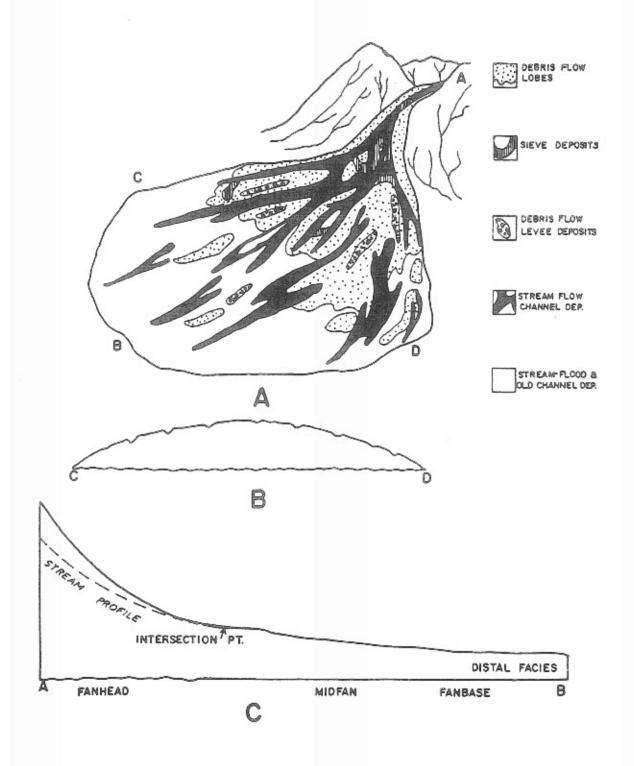
Knowledge of an area's geomorphic history and current depositional patterns, one can characterize and predict sediment loads, channel patterns and other characteristics in the fluvial system. Figure 8 illustrates the principal river types, and Figure 9 classifies channels based on pattern and type of sediment load. The Gila and Agua Fria river systems that currently exist in the Goodyear-Phoenix area are typical of braided and slightly meandering channel patterns. Sediment size in these fluvial systems are large; stream velocities are high; and stream channels have



- (A) Principal types of sandstone reservoir geometries illustrated for fluvial sandstone bodies.
- (B) Cross-sectional geometries of fluvial sandstone and conglomerate bodies.

Source: Ethridge, 1985; Surface and Subsurface Methods of Investigation and Classification of Fluvial Systems.

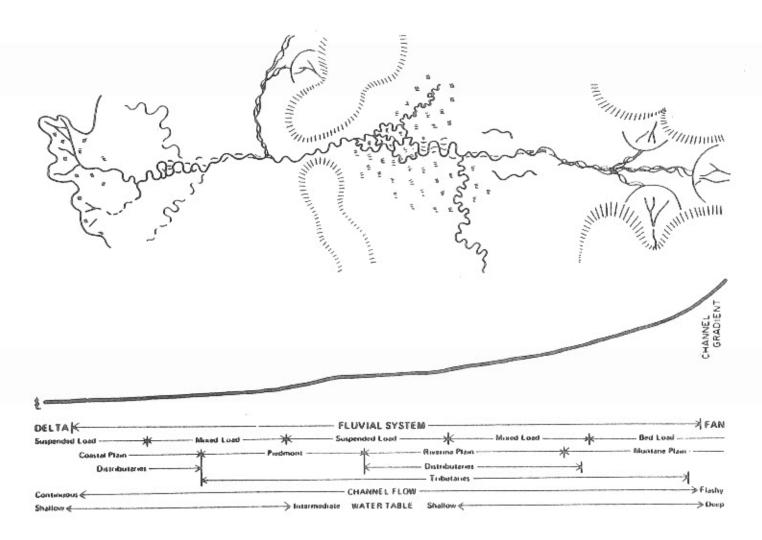
Figure 5



Distribution of Sedimentary deposits and profiles of an idealized arid-region fan.

Source: Ethridge, 1985; Modern Alluvial Fans and Fan Deltas.

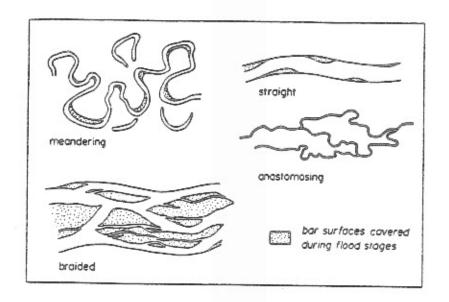
Figure 6



Hypothetical fluvial system traversing a montane basin and associated riverine plain and debouching across a piedmont into a prograding, deltaic coastal plain.

Source: Galloway, 1985; Meandering-Streams Modern and Ancient.

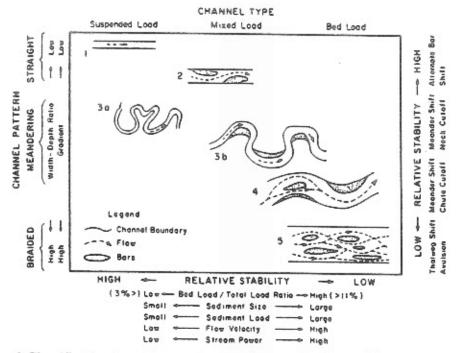
Figure 7



Plan view configuration of principal river types.

Source: Ethridge, 1985; Surface and Subsurface Methods of Investigation and Classification of Fluvial Systems.

Figure 8



Channel Classification based on pattern and type of sediment load with associated variables and relative stability indicated.

Source:

Ethridge 1985; Surface and Subsurface Methods of Investigation and Classification of Fluvial Systems

Figure 9

relatively low stability. In other words, these stream channels will migrate laterally through time as stream velocities and sediment loading varies and subsequently burying previously deposited stream sediments.

A review of U.S.G.S. topographic maps and historical aerial photographs of the site indicated the possibility of paleostream channels oriented in a north-to-south direction through the PGA site. The topographic map (Figure 10) illustrates the basin region between the Sierra Estrella Mountain Range to the south and the White Tank Mountain Range to the west. The Agua Fria River flows in a southerly direction to the east the PGA site, and the Gila River flows in a westerly direction to the south of PGA. The Gila and Agua Fria river systems probably migrated laterally throughout this region during recent geologic time (several millions of years).

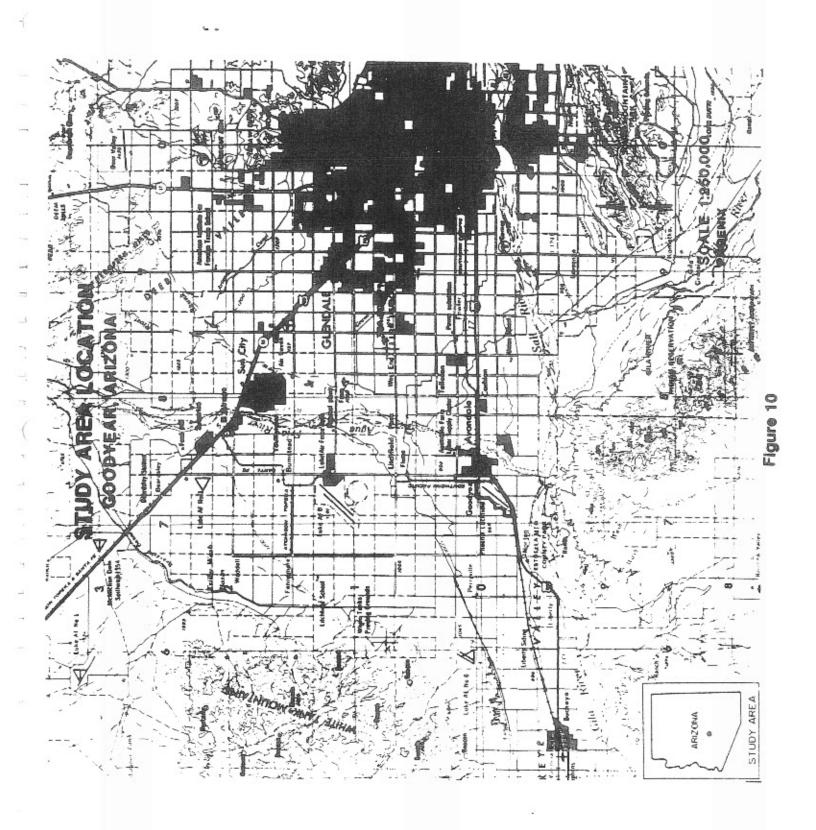
Geologic cross sections of subsurface sediments were constructed from the existing well log data from the Phase I program and from previous investigations (Appendix A contains several cross sections generated from Subunit A well data). Cross sections from previous investigations were predominantly oriented parallel to the runway. These cross sections also generalized the geology of the site into fine and coarse-size sediments. The cross sections were created to show the complex sedimentary sequence, to illustrate the depositional history, and to determine if buried stream channels were trending in a northerly to southerly direction.

These cross sections in Appendix A illustrate the interpretation of north-south trending, buried stream channels and show similarities in pattern as in Figure 5. These cross-sections illustrate the variable and complex depositional history of the area, which directly influences groundwater and contaminant movement.

# 2.3 AQUIFER CHARACTERISTICS FROM PHASE I PROGRAM

During the Phase I program, five extraction and seven injection wells were drilled and constructed, then pump tests were performed. One of the injection wells (I-3) is not being used because of poor infiltration rates. A summary of the well construction for the extraction and injection well is shown in Tables 1 and 2, respectively. Aquifer characteristics for the extraction wells are noted in Table 3. The results of these tests depict variable pumping rates and drawdowns within the extraction wells. The pump test data indicate the variable hydrogeologic conditions that exist at this site.

The geologic information and pump test data depict a heterogeneous hydrogeologic system. Variations in sediment size influence permeability and hydraulic conductivities of the aquifer material. Zones of higher hydraulic conductivity (coarser grained sediments) will show preferential flow over zones of lower hydraulic conductivity (fine grained sediments).



PHASE I - WELL CONSTRUCTION SUMMARY

# PGA WELL DATA EXTRACTION WELL SUMMARY

TABLE 1

	Ext. Wells as Bid	NE-1	NE-2	NE-3	NE-4	NE-5
Drilled Depth	110'	96'	92'	92'	96,5'	98'
Cased Depth	110'	90'	90'	90'	95'	95'
0.040" Screen Internal	85' - 105'	55' - 85'	60' - 65'	55' - 85'	50' - 55'	50' - 60'
0.020" Screen Interval			65' - 85'		70' - 90'	80' - 90'
Total Screen Length	30'	30'	25'	30'	25'	20'
Stainless Casing Intervals	40' - 85' 105' - 110'	35' - 55' 85' - 90'	35' - 60' 85' - 90'	35' - 55' 85' - 90'	30' - 50' 55' - 70' 40' - 75'	30' - 50' 60' - 80' 90' - 95'
Total Stainless Casing Length	40'	25'	30'	25'	40'	45'
Conductor Casing Interval	0' - 40'	0' - 35'	0' - 35'	0' - 35'	0' - 30	0' - 30'
Pump Test Pumping Rate	100	110	58	85	36	80
Approximate Drawdown		4'	21'	35'	32'	31'
1989 Depth to Groundwater		46.80'	47.25'	44.70'	46.15'	45.60'

TABLE 2

PHASE I - WELL CONSTRUCTION SUMMARY
PGA WELL DATA
INJECTION WELL SUMMARY

	Injection Wells as bid	I-1	I-4	I-6	I-8	I-9	I-10
Drilled Depth	110'	82'	95'	63'	70'	71'	71
Cased Depth	110'	57'	90'	63'	67'	68'	65'
0.040" Screen Interval	30' - 105'	27' - 52'	30' - 65'	28' - 58'	22' - 62'	23' - 63'	35' - 60'
0.020" Screen Interval			75'-85'				25' - 35'
Total Screen Length	75'	25'	45'	30'	40'	40'	35'
Stainless Casing Intervals	20' - 30' 105' - 110'	7' - 27' 52' - 57'	20' - 30' 65' - 75' 85' - 90'	18' - 28' 58' - 63'	12' - 22' 62' - 67'	13' - 23' 63' - 68'	15' - 25' 60' - 65'
Total Stainless Casing Length	15'	25'	25'	15'	15'	15'	15'
Conductor Casing Interval	0' - 20'	0' - 7'	0' - 20'	0' - 18'	0' - 12'	0' - 13'	0' - 15'
Pump Test Pumping Rate	100	17	51	3	<3	39	10
Approximate Drawdown		5'	25'	2'	7'	8'	7'
1989 Depth to Groundwater		39.97'	46.80'	49.55'	79.13'	45.81'	45.52'

TABLE 3 AQUIFER PROPERTIES PGA EXTRACTION WELLS

	NE-1	NE-2	NE-3	NE-4	NE-5
Pump Test Pumping Rate, gpm	110	58	85	36	80
Approximate Drawdown, ft	4	21	35	32	31
Aquifer Thickness (b), ft	44	44	45	45	50
Transmissivity Values (T), gpd/ft	8580	11440	3870	10350	15000
Est. Hydraulic Conductivity (K), ft/day	195	260	86	230	300

Equations:

T=Kb K= T/b

# 2.4 GROUNDWATER

Groundwater elevations were collected monthly at the PGA site for Subunit A monitoring, extraction, and injection wells. This information is presented in Figure 11, which is a computer-generated groundwater contour map of the Subunit A aquifer. Produced using March 1991 data, the map illustrates the effect the extraction system has on the groundwater system. The hydraulic gradient across the site ranges from 0.002 to 0.005 and slopes in a westerly-southwesterly direction.

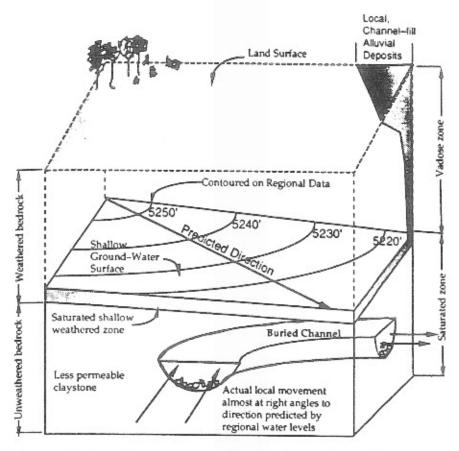
### 2.5 GROUNDWATER CONTAMINATION

Groundwater samples are collected quarterly for chemical analysis to determine the concentration, extent, and nature of the TCE plume. An isopleth map was produced to illustrate the TCE plume (see Figure 12), which flows in a southerly- southwesterly direction. When overlayed with the groundwater contour map (Figure 13), the plume is offset from the dominant flow direction (except in the area of the extraction wells), indicating that the TCE plume is transported in a different pathway other than in the hydraulic downgradient direction. The groundwater and TCE are preferentially flowing along pathways of higher hydraulic conductivity; these pathways are interpreted as buried stream channels.

An example of this interpretation is provided in Figure 14, which illustrates a geologic environment of low hydraulic conductivity units with a higher hydraulic conductivity unit (i.e. buried stream channel) of significant lateral extent. These stratigraphic sequences can consist of depth-uncorrelatable and vertically-stacked channel deposits that provide preferential pathways for groundwater movement. Each stream channel can have different depositional processes and may not be vertically interconnected. These stream channels may be horizontally connected over short distances and separated vertically by finer-grained sediments (silts and clays). Each buried channel sand has its own primary component of flow in the stratigraphically down-dip direction. Monitoring such a heterogeneous system requires detailed boring log information to determine the location of these channels (Nielson, 1991.

### 2.6 GROUNDWATER MODELING

A portion of the groundwater treatment program addresses pumping water out of the Subunit A aquifer, then treating and reinjecting the treated water back into the aquifer. These activities must not have any adverse effect upon the groundwater system in the area. ICF developed for the PGA site a groundwater model using the Coupled Fluid, Energy, and Solute Transport (CFEST) software. This model was presented in the Conceptual Design Analysis Report for the Operable Unit Treatment Plant (ICF, 1988). The unit design included 10 extraction wells and 12 recharge wells. The withdrawal rate from the extraction system will be 1,150 gpm. The maximum drawdown during Phase I is predicted to be 8 feet near extraction well NE-1. The maximum mounding is 6 feet and occurs in the center of the recharge zone.



Low hydraulic conductivity environment with a buried, higher hydraulic conductivity channel.

Source:

Nielson, 1991. Practical Handbook of Ground-Water Monitoring

Figure 14

Figures 15, 16, 17, and 18 indicate the effects the extraction system will have on the TCE plume after 10 years under winter flow conditions, 10 years under summer flow conditions, 20 years under winter flow conditions, and 20 years under summer flow conditions, respectively. These figures illustrate that the TCE levels after 10 years will still exceed 10 ppb to the south of the PGA property line. After 20 years, the TCE levels will range from 0.5 to 5.0 ppb. The model predicts the TCE can be contained within the limits of PGA after a 20-year period. The current groundwater contour map (Figure 11) shows a groundwater mounding of approximately 4 feet in the central portion of the injection site. Groundwater drawdown is estimated at approximately 2 to 3 feet and is located at extraction well NE-3. The modeling predictions fall short of the current field data, this is to be expected, because of the heterogenieties of the hydrogeologic system. However, the model does illustrate with some degree of confidence the extent of the plume in the southern portion of the PGA property and potentially off-site as well. The model was performed in 1988, prior to completion of the Phase I and Phase II program. Additional information is available that could enhance the results of the groundwater model and should be incorporated.

### 3.0 PHASE II PROGRAM

### 3.1 INTRODUCTION

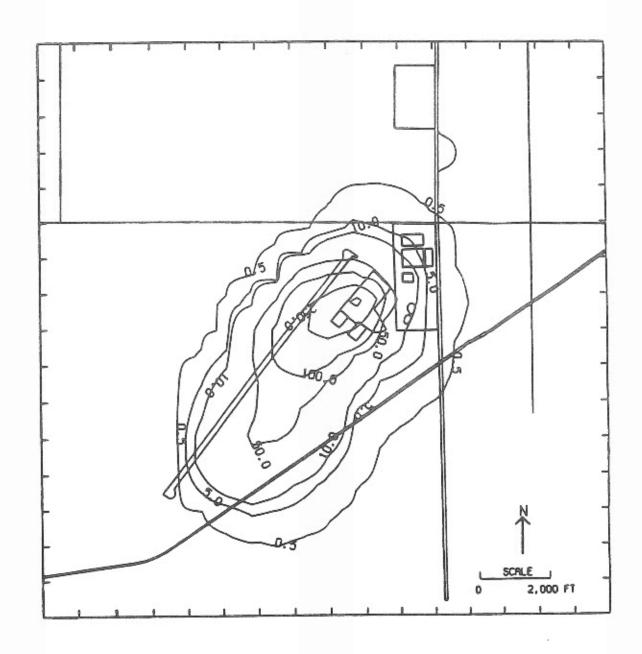
The original Phase II program called for installing the remaining extraction/injection wells (refer to Figure 3 for original extraction/injection well locations) according to the original plan. Because of the heterogeneous nature of the geology and data high TCE levels in the area of monitoring well EMW-13, however, ICF proposed an alternative plan for Phase II extraction and injection wells in March 1991. This latter plan would aid in properly locating future wells at the PGA site.

In reevaluating Phase I work and reviewing past documentation, water levels and TCE concentrations from the Subunit A monitoring wells, ICF determined that further information was necessary to determine geologic conditions in areas where data was limited or unavailable. In areas were TCE concentrations were 100 parts per billion (ppb) near the southern boundary along Highway 85, ICF was concerned with the off-site migration potential of the TCE plume.

The TCE and groundwater maps indicate that the hydraulic gradient is toward the extraction system, but the TCE plume is oriented in a southerly-southwesterly direction and is offset to the south of the regional hydraulic gradient. Based on previous geologic and hydrologic information, ICF is concerned about potential off-site migration through preferential pathways that are oriented differently than the regional hydraulic gradient indicates. Previous groundwater modeling indicates plume containment can be achieved, but this may be approximately 10-20 years from the present.

ICF developed a plan to address this situation and presented this to Goodyear and EPA. The proposed plan was to use Cone Penetrometer Tests (CPT) to determine lithology and collect groundwater and soil samples for chemical and grain size analysis. This information would help locate future Phase II wells. CPT would enable ICF to determine the lithology for proposed extraction/injection wells quicker than with traditional borings and split spoon sampling. CPT utilizes a specially design probe to continuously measure dynamic pore pressure, cone resistance and sleeve friction which can be calibrated with well log information to determine subsurface lithologic characteristics.

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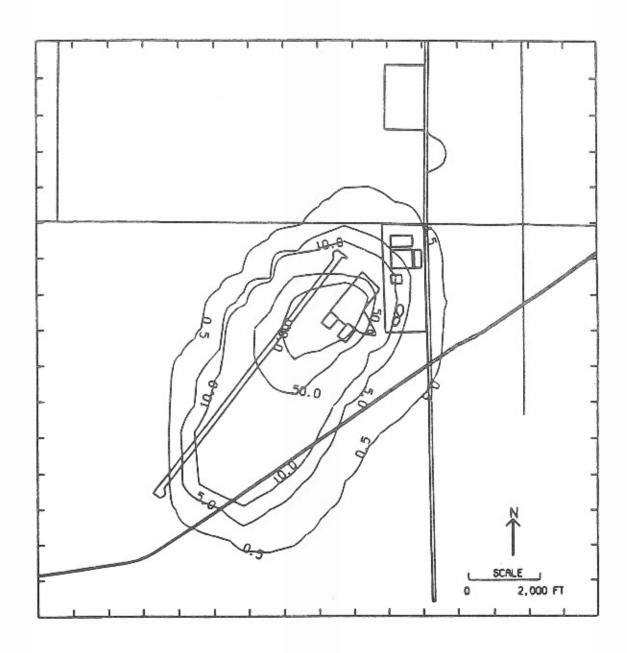


Predicted TCE Levels (ppb) at Water Table after 10 years of Pumping under Winter Flow Conditions, Uniform Design (1,600 gpm).

Source:

ICF 1988; Design Analysis of Operable Unit Remedy for the PGA Site.

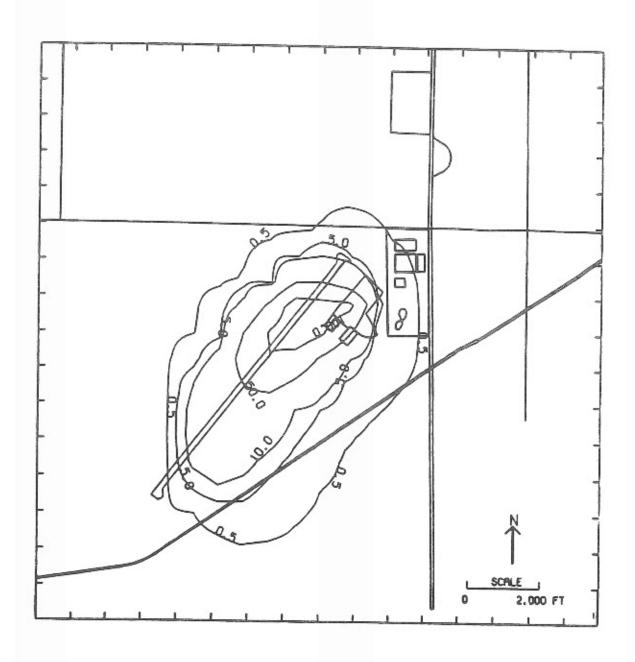
Figure 15



Predicted TCE Levels (ppb) at Water Table after 10 years of pumping under Summer Flow Conditions, Uniform Design (1,600 gpm).

Source: ICF, 1988; Design Analysis of Operable Unit Remedy for the PGA Site.

Figure 16

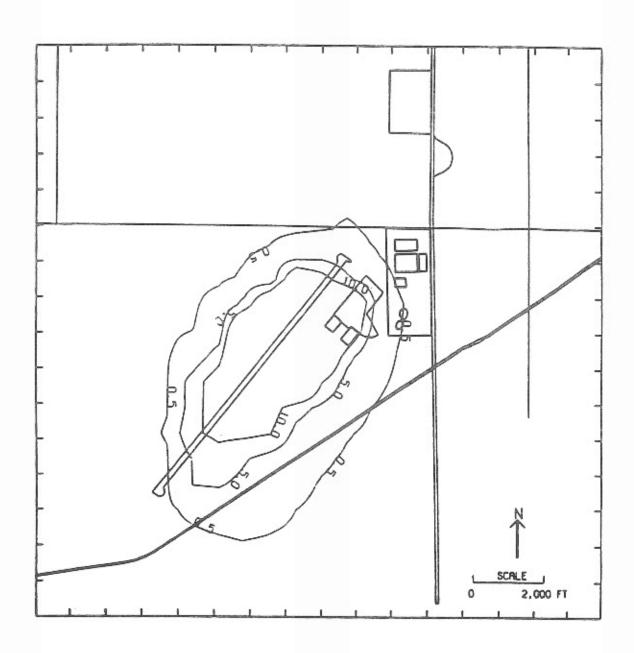


Predicted TCE Levels (ppb) at Water Table after 20 years of pumping under /winter Flow Conditions, Uniform Design (1,600 gpm).

Source:

ICF, 1988. Design Analysis of Operable Unit Remedy for the PGA Site.

Figure 17



Predicated TCE Levels (ppb) at Water Table after 20 years of Pumping under Summer Flow Conditions, Uniform Design (1,600 gpm).

Source:

ICF, 1988. Design Analysis of Operable Unit Remedy for the PGA Site.

Figure 18

A total of 29 CPT sites (Figure 19) were located for determining the location of Phase II extraction/injection wells. In addition to the originally proposed extraction and injection well locations in the southern portion of the site, one new extraction well and four injection wells were proposed in the area of monitoring well EMW-13 to create a groundwater mound to divert the TCE plume toward the proposed extraction well. EPA requested further information before completely agreeing to the proposed extraction/injection wells located near EMW-13. The proposed CPT program outlined by ICF would identify if the TCE plume was beyond (in the downgradient direction) the monitoring wells along the southern boundary of PGA.

The pilot hole boring program was scheduled to begin during mid-April, but because of licensing and registration requirements for contractors to work within the state of Arizona, the plan was modified to hire a drilling contractor licensed in Arizona and to use hollow-stem auger and split spoon sampling techniques. This phase of the program precluded the actual Phase II extraction/injection well installation that was scheduled to begin in early May 1991. The revised schedule for the pilot borings was slated to begin May 6, 1991, followed by installation of extraction/injection wells.

Prior to Phase II work commencing, Goodyear and ICF were informed by EPA of potential petroleum hydrocarbon contamination in the groundwater near the proposed extraction well locations in the northern portion of the project site. This information was presented to Goodyear and ICF during the April 1991 meeting in San Francisco, California. The Phase II plan was then further modified, and the pilot hole borings located north of pilot boring PB-27/I-19 were temporarily withdrawn from the scope of work. The program continued in the southern portion of the site as planned.

### 3.2 PILOT HOLE BORING PROGRAM

Heber Mining and Exploration Company (Phoenix, Arizona) was contracted to perform the drilling of the pilot borings and to collect split spoon soil samples at intervals specified by ICF. Work commenced on May 9, 1991 and the first phase was completed May 23, 1991. The initial plan was to auger and sample 29 boring locations; however, because of potential petroleum hydrocarbon contamination in the northern portion of PGA, the Pilot Hole Boring Program was modified to work only in the southern portion of PGA. This part of the program did not extend any further north than where existing buildings are located (PB-27/I-19 area, refer to figure 20). Future work in the northern portion is being considered, and ICF is drafting a work plan at Goodyear's request for the northern PGA site.

Geraghty and Miller, Inc. (Phoenix, Arizona) is currently assessing the petroleum hydrocarbon contamination and proposing future investigations at other localities at the PGA site. G&M's investigations revealed petroleum hydrocarbon contamination in the soil and groundwater in the northern portion of the site between monitoring wells EMW-16 and EMW-10. Any future extraction wells in this location will need to be carefully sited and monitoring wells installed to ensure that petroleum hydrocarbons are not extracted and treated in the air stripping plant. ICF is preparing a work plan to address future Phase II work in the northern portion of the site.

03761-01-B

Figure 19

During the Phase II Pilot Hole Boring Program, 18 pilot borings were drilled and sampled. Sampling consisted of soil and water samples for grain-size analysis and groundwater chemistry. Soil samples were collected at three intervals based on the proposed extraction/injection well screen depths. For the injection wells, three soil samples were randomly collected and composited within the proposed screened interval (20 to 60 below ground surface) and sent to Western Technologies, Inc. (Phoenix, Arizona) for grain-size analysis. The same procedure was used in selecting the soil samples from the proposed extraction well. The soil samples were collected between 40 and 110 feet below ground surface.

Groundwater samples were collected after the pilot borings were terminated. The depth of the pilot borings vary according to geologic conditions and did not exceed 110 feet in depth. Table 4 presents a summary of the pilot holes with total boring depth and depth to groundwater. Water samples were collected using disposable teflon bailers modified to collect groundwater at depth (similar to a point source bailer). The bailers were weighted, and the top of the bailer was modified to allow water to flow freely through as the bailer was lowered into the boring. This procedure was done because TCE is a volatile organic and the drilling procedures are anticipated to create turbid groundwater conditions, thus volatilizing TCE (if present) and reducing the concentrations. Modifying the bailers would enable the sampler to retrieve groundwater near the bottom of the boring, therefore obtaining a more representative sample than if collected near the water table. The results obtained, along with the geologic data, will be used to determine the location of future extraction/injection wells at PGA.

# 4.0 SUMMARY AND FINDINGS FROM THE PILOT HOLE BORING PROGRAM

### 4.1 SIEVE/GRAIN ANALYSES

Sieve analysis was performed on soil samples collected from the pilot hole borings. Sieve analysis allows for the design of the screened interval in the extraction/injection wells. Goodyear requested that .040 screen interval casing that was purchased during Phase I be utilized. Therefore, the sieve analysis will be used to determine filter pack size.

The grain size plots in Appendix B illustrate that the soil samples contain a large percentage of fine material. Each of the grain size plots have two grain size curves. Originally the results from the lab were plotted and reviewed. Because of the excessive fine material in the samples, the coarsest material was eliminated, and the percentages passing through the sieves were recalculated. The coarsest material (3/8-inch and larger) was deleted because this coarse material does not present a problem in the filter pack design. Based on preliminary review of the sieve analysis and the predetermined slot size for the extraction wells, there will be a fine-grained passing through the screened interval.

# 4.2 CHEMICAL ANALYSIS OF GROUNDWATER SAMPLES

Groundwater samples were collected in all pilot borings that extended below the groundwater table. Groundwater was encountered approximately at the 50 to 55-foot depth below ground surface. Table 5 contains a summary of the laboratory analysis from Analytical Technology Inc. The methodsused for analysis included EPA method 601/602 for volatile organics and the modified EPA method 8015 for petroleum hydrocarbons. ICF wanted to verify if petroleum hydrocarbon

03761-01-B

		TABL	E 4		
		Pilot	Boring	Summary	
PB#	BORING DATE	BORING DEPTH	WATER DEPTH	GROUT DEPTH	WELL SITE
5	Suspended				E-10
6	Suspended				E-06
7	Suspended				
8	Suspended				E-08
9	Suspended				E-07
10	Suspended				
11	Suspended				
12	Suspended				I-13
13	May 10-91	107	57	28	I-14
14	May 16-91	89	51	40	
15	May 13-91	107	51	18	
16	May 21-91	107	47	52	
17	May 09-91	107	53	30	E-11
18	May 17-91	107	45	40	
19	May 20-91	43		37	
19	May 20-91	47		35	
20	May 20-91	102	54	62	
21	May 13-91	97	56	2	I-15
22	May 15-91	99	40	0	I-16
23	May 15-91	14		0	I-17
23	May 15-91	28	20	16	I-17
24	May 23-91	67	45	37	I-12
25	Suspended				
26	Suspended				I-18
27	May 15-91	97	55	3	I-19
28	May 14-91	107	56	4	I-20
29	May 22-91	60	40	29	I-21

TABLE 5. PHOENIX-GOODYEAR AIRPORT - WATER AMALYSES

SAMPLE MUMBER SAMPLE LOCATION	03761-PB13-GW1 PB-13	03761-TB14-GH1	03761-P815-GW1	03761-P816-GH1	03761-PB17-GH1
LABORATORY MUMBER DATE SAMPLED UNIT	10568301 5/10/91 ug/L	PB-14 10578501 5/16/91 ug/L	P8-15 10571801 5/13/91 ug/L	P8-16 10583101 5/21/91 ug/L	P8-17 10566001 5/9/91 ug/L
VOLATILE ORGANICS - EPA 601/602			9		
BENZENE BROMODICHLOROMETHANE BROMOFORM BROMOMETHANE CARBON TETRACHLORIDE	0.5 M 0.2 M 0.2 M 0.2 M 0.2 N	0.5 N 0.2 0.2 N 0.2 N 0.2 M	0.6 0.2 M 0.2 M 0.2 M 0.2 N	0.5 M 0.2 M 0.2 M 0.2 N	0.5 N 0.9 0.2 M 0.2 M
CHLOROBENZENE CHLOROETHANE CHLOROFORN CHLOROMETHANE DIBROMOCHLOROMETHANE	0.5 M 0.2 M 3.1 0.2 M 0.2 M	0.5 M 0.2 M 1.5 0.2 N 0.3	0.5 M 0.2 M 1.0 0.2 M 0.2 M	0.5 M 0.2 M 3.3 0.2 M 0.2 M	0.5 N 0.2 N 3.9 0.2 N
2-CHLOROETHYL VINYL ETHER 1,3-DICHLOROBENZENE 1,2 & 1,4-DICHLOROBENZENE DICHLORODIFLUOROMETHANE 1,1-DICHLOROETHANE	0.5 N 0.5 N 0.5 N 0.2 N 0.2 N	0.5 M 0.5 M 0.5 M 0.2 M 0.3	0.5 M 0.5 M 0.5 M 0.2 M 1.9	0.5 M 0.5 M 0.5 M 0.2 N	0.5 N 0.5 N 0.5 N 0.2 N 0.2 N
1,2-DICHLOROETHAME 1,1-DICHLOROETHEME 1,2-DICHLOROETHEME (TOTAL) 1,2-DICHLOROPROPAME CIS-1,2-DICHLOROPROPEME	0.2 N 2.4 0.2 N 0.2 N 0.2 N	0.2 W 1.6 0.2 M 0.2 N 0.2 N	0.5 12.8 0.6 0.2 M 0.2 N	0.2 3.0 0.2 M 0.2 M	0.2 W 3.5 0.2 W 1.4 0.2 M
TRANS-1,3-DICHLOROPROPENE ETHYLBENZENE METHYLENE CHLORIDE 1,1,2,2-TETRACHLOROETHANE TETRACHLOROETHENE	0.2 M 0.5 M 2.0 M 0.2 W 2.6	0.2 M 0.5 M 2.0 M 0.2 M 0.2 N	0.2 N 0.5 N 2.0 N 0.2 M	0.2 M 0.5 M 2.0 M 0.2 N 0.4	0.2 M 0.5 M 2.0 M 0.2 M 3.8
TOLUENE 1,1,1-TRICHLOROETHANE 1,1,2-TRICHLOROETHANE TRICHLOROETHENE TRICHLOROFLUOROMETHANE	0.5 M 3.7 0.2 M 8.7 0.5 N	0.5 N 0.2 M 0.2 M 3.7 0.5 N	0.5 M 0.7 0.2 M 54.8 0.5 M	0.5 M 0.5 0.2 N 220.0 0.2	1.5 21.4 0.2 M 29.2 0.5 W
VINYL CHLORIDE TOTAL XYLEMES TRICHLOROTRIFLUOROETHANE	0.2 M 0.5 M 2.0 M	0.2 N 0.5 N 2.0 M	0.2 N 0.5 N 2.2	0.2 M 0.5 N 2.0 W	0.2 M 0.5 M 2.0 M
FUEL HYDROCARBONS, (mg/L) MODIFIED EPA METHOD 8015	5.0 и	5.0 N	5.0 W	5.0 M	5.0 M

TABLE 5 (cont.) PHOEMIX-GOODYEAR AIRPORT - WATER ANALYSES

SAMPLE NUMBER SAMPLE LOCATION	03761-TB18-G⊌1 PB-18	03761-P820-G⊮1 P8-20	03761-PB21-GW1	03761-PB22-GW1	03761-PB23-GW1
LABORATORY NUMBER DATE SAMPLED UNIT	10578502 5/16/91 Ug/L	10582001 5/20/91 ug/L	PB-21 10571802 5/13/91 ug/L	PB-22 10577101 5/16/91 ug/L	PB-27 10573801 5/15/91 ug/L
VOLATILE ORGANICS - EPA 601/602					
BENZENE BROMODICHLOROMETHANE BROMOFORM BROMOMETHANE CARBON TETRACHLORIDE	0.5 M 0.5 0.2 M 0.2 M 0.2 M	0.8 0.2 M 0.2 M 0.2 M 0.2 M	0.5 M 0.2 M 0.2 M 0.2 M 0.2 M	0.5 M 0.2 M 0.2 M 0.2 M 0.2 M	0.5 N 0.2 N 0.2 N 0.2 N
CHLOROBENZENE CHLOROETHANE CHLOROFORM CHLOROMETHANE DIBROMOCHLOROMETHANE	0.5 M 0.2 M 0.8 0.2 M 0.5	0.5 N 0.2 N 3.8 0.2 M 0.2 M	0.5 N 0.2 N 2.2 0.2 M 0.2 M	0.5 N 0.2 M 0.8 0.2 M 0.2 M	0.5 N 0.2 M 1.0 0.2 M 0.2 N
2-CHLOROETHYL VINYL ETHER 1,3-DICHLOROBENZENE 1,2 & 1,4-DICHLOROBENZENE DICHLORODIFLUOROMETHANE 1,1-DICHLOROETHANE	0.5 M 0.5 N 0.5 N 0.2 M 0.2 M	0.5 N 0.5 N 0.5 N 0.2 N 0.2 N	0.5 M 0.5 N 0.5 N 0.2 N 0.6	0.5 M 0.5 M 0.5 M 0.2 M 0.2 M	0.5 M 0.5 M 0.2 M 0.2 M
1,2-DICHLOROETHAME 1,1-DICHLOROETHEME 1,2-DICHLOROETHEME (TOTAL) 1,2-DICHLOROPROPAME CIS-1,2-DICHLOROPROPEME	0.2 M 0.2 M 0.2 M 0.2 M 0.2 M	0.2 M 0.2 N 0.2 N 0.2 N 0.2 N	0.2 2.1 0.3 0.2 N 0.2 N	0.2 M 0.2 M 0.2 M 0.2 M 0.2 W	0.2 M 2.2 0.2 N 0.2 M
TRANS-1,3-DICHLOROPROPENE ETHYLBENZENE METHYLENE CHLORIDE 1,1,2,2-TETRACHLOROETHANE TETRACHLOROETHENE	0.2 M 0.5 M 2.0 M 0.2 M 0.2 N	0.2 M 0.5 M 2.0 M 0.2 N 0.3	0.2 M 0.5 M 2.0 N 0.2 W 0.8	0.2 M 0.5 M 2.0 M 0.2 M 0.5 N	0.2 M 0.5 M 2.0 N 0.2 N
TOLUENE 1,1,1-TRICHLOROETHANE 1,1,2-TRICHLOROETHANE TRICHLOROETHENE TRICHLOROFLUOROMETHANE	0.5 N 0.2 M 0.2 M 2.2 0.5 M	0.5 M 0.2 M 0.2 M 44.0 0.5 M	0.5 M 1.2 0.2 N 135.0 0.5 M	0.5 M 0.2 N 0.2 N 1.2 0.5 M	0.5 M 0.2 M 0.2 M 12.2 0.5 M
VINYL CHLORIDE TOTAL XYLENES TRICHLOROTRIFLUOROETHANE	0.2 N 0.5 N 2.0 N	0.2 M 0.5 2.0 M	0.2 M 0.5 M 2.0 M	0.2 M 0.5 N 2.0 N	0.2 M 0.5 M 2.0 M
FUEL HYDROCARBONS, (mg/L) MODIFIED EPA METHOD 8015	5.0 M	5.0 W	5.0 M	5.0 M	5.0 N

TABLE 5 (cont.) PHOEMIX-GOODYEAR AIRPORT - WATER AMALYSES

	SAMPLE NUMBER SAMPLE LOCATION	03761-PB24-GW1 PB-24	03761-PB28-GW1	03761-PB29-GW1	COMPOSITE SOIL
	LABORATORY NUMBER DATE SAMPLED UNIT	10588501 5/23/91 ug/L	PB-28 10571803 5/13/91 ug/L	PB-29 10586001 5/22/91 ug/L	PB-13/PB-17 10568305 5/10/91 mg/kg
VOLATIL	E ORGANICS - EPA 601/602				
BENZENE		0.5 м	0.6	0.9	0.025 W
BROMOFO	CHLOROMETHANE	0.2 M	0.2 N	0.2 M	0.010 M
BRONOME		0.2 M 0.2 M	0.2 N 0.2 N	0.2 и	0.010 M
	TETRACHLORIDE	0.2 N	0.2 W	0.2 M 0.2 N	0.010 N 0.010 N
CHLOROB		0.5 W	0.5 M	0.5 W	0.025 พ
CHLOROF		0.2 M 0.2 M	0.2 M	0.2 M	0.010 M
CHLOROM		0.2 M	0.4 0.2 N	5.8	0.010 M
DIBROMO	CHLOROMETHAME	0.2 N	0.2 W	0.2 M 0.2 M	0.010 N 0.010 N
	OETHYL VINYL ETHER	0.5 W	0.5 M	0.5 W	0.025 M
1,3-010	HLOROBENZENE ,4-D1CHLOROBENZENE	0.5 M	0.5 M	0.5 W	0.025 №
	OD I FLUOROMETHANE	0.5 M 0.2 M	0.5 N 0.2 N	0.5 M	0.025 M
	HLOROETHAME	0.2 N	0.2 N	0.2 M 0.2 M	0.010 N 0.010 N
1,2-DIC	HLOROETHANE	0.2 N	0.2 M	0.2 N	0.010 M
	HLOROETHENE HLOROETHENE (TOTAL)	0.2 N 0.2 N	0.2 M	0.2 N	0.010 M
	HLOROPROPANE	0.2 M	0.2 M 0.2 M	0.2 M	0.010 N
cis-1,2	-DICHLOROPROPENE	0.2 M	0.2 N	0.2 M	0.010 N 0.010 N
	,3-DICHLOROPROPENE	0.2 N	0.2 M	0.2 N	0.010 M
ETHYLBE	NE CHLORIDE	0.5 M 2.0 M	0.5 M	0.5 и	0.025 N
	TETRACHLOROETHANE	0.2 M	2.0 M 0.2 N	2.0 M 0.2 M	0.100 N
	LOROETHEME	0.2 N	0.5	0.2 N	0.010 M 0.010 M
TOLUENE	Low operation	0.5 ⋈	0.5 M	0.5 ผ	0.025 N
	RICHLOROETHANE RICHLOROETHANE	0.2 M	0.6	0.2 M	0.010 M
	ROETHENE	0.2 M 0.2 M	0.2 N	0.2 N	0.010 и
	ROFLUOROMETHANE	0.5 N	32.1 0.5 M	0.8 0.5 N	0.010 M 0.100 M
AINAF CI		0.2 ₩	0.2 M	0.2 M	0.010 H
TOTAL XI		0.5 M	0.5 N	0.5 M	0.025 M
TRICHLO	NOTRIFLUOROETHANE	2.0 M	2.0 N	2.0 N	0.010 8
FUEL NYD	ROCARBONS, (mg/L) TED EPA METHOD 8015	5.0 N	5.0 м	5.0 M	5.0 w

contamination was in areas where future extraction wells were targeted. There were no petroleum hydrocarbons detected in the groundwater samples collected during this round of Phase II work.

The primary contaminant of concern is trichloroethene (TCE). The highest concentration of TCE detected in the groundwater samples collected during this program was 220 ppb. (PB-16-Figure 21). This location is within the TCE plume (refer to Figure 12) near the Phase I extraction wells. Groundwater samples collected from the pilot hole borings along the southerly boundary of PGA all contained concentrations of TCE. The highest value in this area was at PB-21/I-15 location. The TCE concentration at this location is 135 ppb. TCE concentrations obtained during the Phase II program varied throughout the site and do not necessarily correspond to the TCE isopleth map. This could be another reasonable explanation supporting the buried stream channel theory.

Other volatile organics encountered during the Phase II program that exceed Maximum Level Drinking Water Standards are 1,1-dichloroethene (PB-15, 12.8 ppb). Table 6 lists all organics detected in the water samples collected.

### 5.0 CONCLUSIONS AND RECOMMENDATIONS

### 5.1 CONCLUSIONS

The Phase II Pilot Hole Program initiated in May 1991 and focusing on the southern portion of the site revealed the following facts:

- 1) The geology of PGA site is highly complex resulting from the deposition of sediments from braided stream channels of the Agua Fria and Gila River systems. The sediments are derived from nearby mountain ranges uplifted by block faulting. The uplifted bedrock material is weathered by water and transported downslope, then deposited as alluvial fans, and further transported downgradient from the source area in stream and river systems. Through geologic time, these materials were reworked and buried by further stream sedimentation, creating a very complex geologic and hydrogeologic environment. Groundwater flow through the sediments can be preferentially oriented in buried stream channels and flow in a stratigraphically downdip direction that may be oriented differently than the hydraulic gradient. Contaminants can be transported along these channels, which have higher hydraulic conductivity values than the surrounding finer-grained sediments.
- 2) Evidence from previous investigations and the Phase I and II program indicate the TCE plume is trending in a southerly-southwesterly direction, and is offset to the south from the regional hydraulic gradient direction. The regional hydraulic gradient is toward the west-southerly direction.
- 3) TCE was detected in all the groundwater samples collected for the pilot hole borings except PB-24/I-12, which is the only location where TCE was not detected. The other borings where TCE was not indicated were borings that did not penetrate the groundwater. This information confirms that TCE concentrations in excess of 100 ppb are located to the south of monitoring wells EMW-13, E-3, and E-4, all of which are very near the southerly property boundary of PGA. The data suggests the possible scenario that the TCE plume could be extended to off-site areas to the south. At this time, the leading edge of the plume cannot be determined, but additional monitoring wells should be considered off-site, south of Highway 85. These wells should be placed within 500 feet of the highway to determine and detect potential contamination. If these wells show

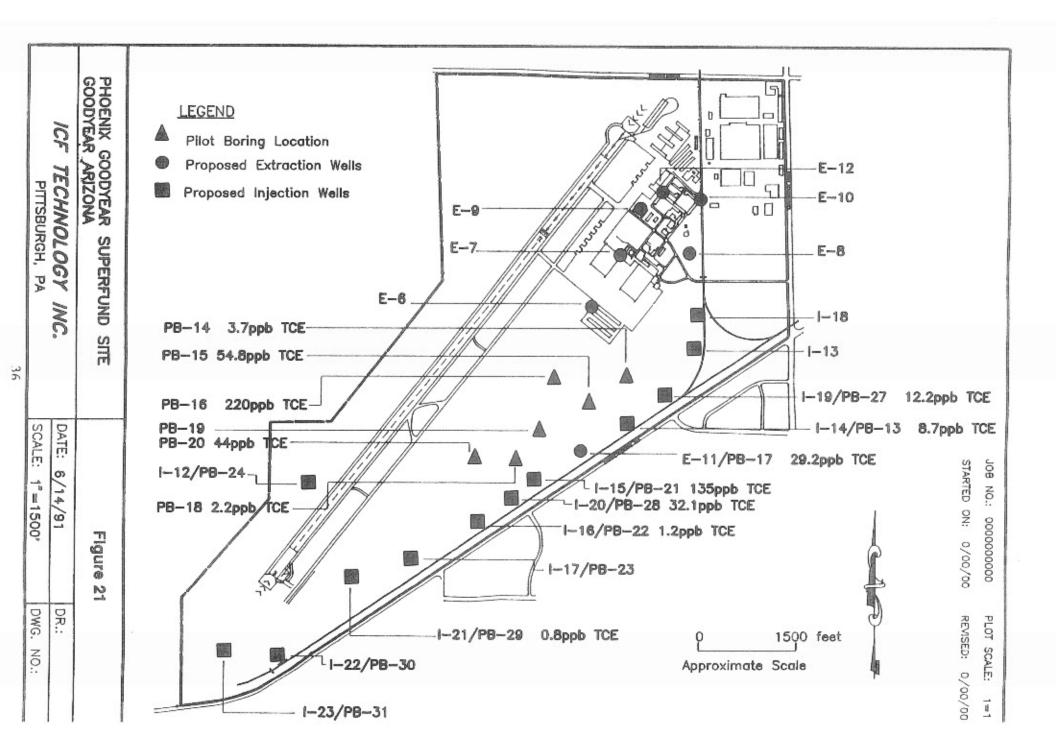


TABLE 6. PHOENIX-GOODYEAR AIRPORT - VOLATILE ORGANICS DETECTED IN WATER SAMPLES.

SAMPLE LOCATION DATE SAMPLED UNIT VOLATILE ORGANICS	DETECTION M LIMITS ug/L	AX. LEVEL DRINKING WATER Ug/L	PB-13 5/10/91 ug/L	P8-14 5/16/91 ug/L	PB-15 5/13/91 ug/L	PB-16 5/21/91 ug/L	PB-17 5/9/91 ug/L	PB-18 5/16/91 ug/L	PB-20 5/20/91 ug/L	PB-21 5/13/91 ug/L	PB-22 5/16/91 ug/L	PB-27 5/15/91 ug/L	PB-28 5/13/91 ug/L	PB-29 5/22/91 ug/L
DENZIME CARROW TETRACHLORIDE 1,1-01CHLOROETHANE 1,2 DICHLOROETHANE 1,1-DICHLOROETHENE	0.5 0.2 0.2 0.2 0.2	5.0 5.0 5.0 7.0	ND ND ND ND 2.4	ND 0.3 ND 1.6	0.6 ND 1.9 0.5 12.8	ND 0.3 WD 0.2 3.0	ND ND ND ND 3.5	ND ND ND ND ND	0.8 WD WD WD	ND ND 0.6 0.2 2.1	MD MD MD MD	ND ND ND ND 2.2	0.6 MD MD MD MD	O.9 ND ND ND ND
1,2-DICHLOROETHENE (TOTAL) 1,2-DICHLOROPROPANE TETRACHLOROETHENE TOLUENE 1,1,1-TRICHLOROETHANE	0.2 0.2 0.2 0.5 0.2	70.0 * 5.0 5.0 1000.0 200.0	MD 2.6 MD 3.7	MD MD MD MD MD	0.6 MD 1.6 MD 0.7	ND 0.4 ND 0.5	ИD 1.4 3.8 1.5 21.4	MD MD MD MD MD	MD MD 0.3 MD MD	0.3 ND 0.8 ND 1.2	DMD DMD DMD DMD	MD ND 0.6 ND ND	ND ND 0.5 ND 0.6	MD MD MD MD
TRICHLOROTRIFLUOROETHAME TRICHLOROETHEME TRICHLOROFLUOROMETHAME TOTAL XYLEMES	2.0 0.2 0.5 0.5	5.0 10000.0	ND 8.7 ND ND	ND 3.7 ND ND	2.2 54.8 ND ND	220.0 0.2 MD	ND 29.2 ND ND	ND 2.2 ND ND	MD 44.0 ND 0.5	135.0 MD MD	ND 1.2 ND ND	MD 12.2 ND ND	ND 32.1 ND ND	DM 8.0 OM OM
TRIHALOMETHAMES BROMODICHLOROMETHAME CHLOROFORM DIBROMOCHLOROMETHAME	0.2 0.2 0.2	100.0	3.1 ND 3.1 ND	2.0 0.2 1.5 0.3	1.0 ND 1.0 NO	3.3 ND 3.3 WD	5.4 0.9 3.9 0.6	1.8 0.5 0.8 0.5	3.8 ND 3.8 ND	2.2 ND 2.2 ND	8.0 O.8 O.8	1.0 MD 1.0 MD	0.4 ND 0.4 ND	5.8 MD 5.8 MD

<sup>\*</sup> Max. level for cis-1,2-Dichloroethene. Max. level for trans-1,2-Dichloroethene is 100 ug/L MD: Not Detected.

contamination, it will be necessary to install future monitoring wells further to the south to determine the leading edge of the plume.

- 4) Groundwater contour data overlayed with the TCE plume indicate the contaminant is not flowing along the regional hydraulic gradient. This data suggests that part of the TCE plume is flowing in zones of higher hydraulic conductivities that are oriented differently than the overall hydraulic gradient. The Subunit A of the Upper Alluvial Aquifer was previously interpreted to be a water table aquifer. While this may be true, the geologic evidence suggests there are semi-confining and confining layers throughout Subunit A which can cause complex flow paths in the aquifer, not necessarily in the hydraulically downgradient direction.
- 5) Pump test data from the extraction wells and previously installed monitoring wells vary throughout the site. The highest and lowest transmissivity values occur in the northern portion of the airport site, indicating that the hydrogeology is heterogeneous. Transmissivity values in the northern portion of PGA average around 33,000 gpd/ft. Hydraulic conductivity values average approximately 500 gpd/ft<sup>2</sup>. Transmissivity values in the southern portion of the site average around 20,000 gpd/ft and hydraulic conductivity values average between 400-500 gpd/ft<sup>2</sup>.

### 5.2 RECOMMENDATIONS

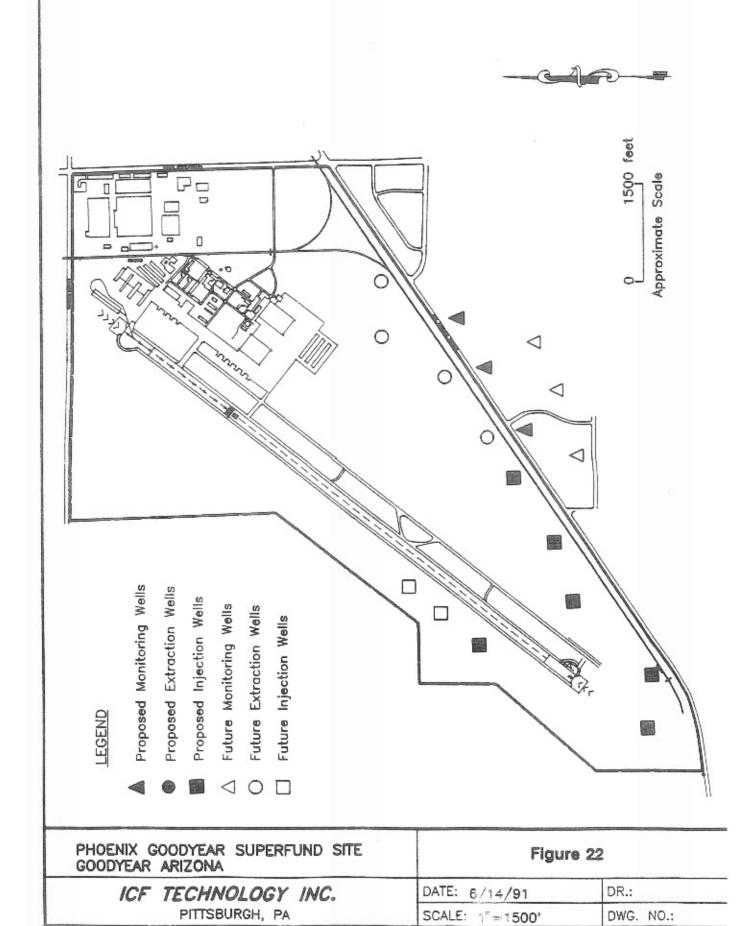
The information obtained during the Phase II Pilot Hole Boring Program and from previous investigations lead to the following recommendations:

- 1) Figure 22 indicates where addition monitoring wells should be located off-site and to the south of the PGA property. These additional monitoring wells will determine if the TCE plume has migrated off-site and to monitor the effects the existing and proposed extraction system will have on the TCE plume. These monitoring wells will be screened 10 feet above the water table to 110 feet below grade (or to the base of Subunit A).
- 2) Further investigation is recommended for the area around monitoring well EMW-13 and off-site to the south. ICF is exploring the feasibility of surface geophysical methods to determine buried stream channels.
- 3) Figure 22 illustrates the areas where future extraction wells may have to be located in the southern portion of PGA to extract TCE contaminated groundwater and to contain the TCE plume on-site. Four extraction well locations are proposed. These locations are based on the best geologic conditions encountered during the pilot hole borings and groundwater samples collected and analyzed for volatile organics and petroleum hydrocarbons. The extraction wells are located in the area with the highest TCE concentrations along the southerly boundary. Extraction well locations were determined based on the best information available to date. The regional hydraulic gradient indicates that the predicted groundwater flow is toward the extraction system; the geology, however, indicates preferential pathways in north-south trending buried stream channels that may direct TCE contamination off-site.

JOB NO.: 0000000000

PLOT SCALE: 1=1

STARTED ON: 0/00/00 REVISED: 0/00/00



- 4) Figure 22 also illustrates the areas where injection wells in the southern portion of PGA may have to be located. Six injection well locations are proposed, again based on the geologic conditions and groundwater samples analyzed for volatile organics and the capacity needed for reinjecting treated groundwater. The injection wells are located in areas where the geology should be conducive for the purpose of injecting treated groundwater and areas where TCE concentrations were below the clean-up levels indicated in the Consent Decree. These injection wells are part of the original Phase II program and will be completed in accordance with the Injection Well Specifications (ICF, 1991). The design of the injection wells as specified in the Injection Well Specifications should be capable of handling the amount of water extracted. Future injection wells may be necessary upon completion of the Northern extraction wells.
- 5) An updated groundwater model should be incorporated in the next phase. The model needs to incorporate new geologic and hydrogeologic data collected during Phase I and Phase II activities to confirm how the proposed E/I system will contain and extract the TCE plume.
- 6) Observation wells will be installed adjacent to each extraction/injection well installed and will be constructed as were observation wells in Phase I. At a minimum, one observation well will be installed adjacent to each injection/extraction well completed.
- 7) Additional data may be necessary to further evaluate the geologic and hydrogeologic conditions. All future extraction/injection well sites that were not a part of the completed Phase II program will have pilot borings, soil samples and groundwater sampling performed prior to installation of extraction and injection wells. Siting of all future extraction/injection well will be based on the best geologic conditions (obtained from pilot boring information), groundwater chemical analysis, and any other data obtained through further investigations. Observation wells will be installed after completion of the pilot borings.

#### 5.3 SCHEDULE OF RECOMMENDATIONS

- Install groundwater monitoring wells off-site and south of monitoring well EMW-13 as shown in Figure 22. Groundwater samples will be collected for chemical analysis with 24-hour turnaround time on lab results. If these wells show TCE contamination, further offsite wells (to the south) may be necessary.
  - 2) Install proposed injection wells as illustrated in Figure 22.
- 3) Future extraction and injection wells may need to be installed as illustrated in Figure 22. These wells will be installed in locations where geologic conditions are favorable and where TCE concentrations are the highest. These extraction wells will contain and reduce off-site contamination.

## Optional Recommendations

- Further delineation of subsurface stream channels near EMW-13 area could be accomplished using surface geophysical methods. This could be performed concurrently with monitoring well and injection well installations.
- 2) Update the groundwater model using new data from Phase I and Phase II work completed at this time. Pump test data, groundwater elevations, TCE concentrations, and reducing pump test data will be evaluated for incorporating into the groundwater model.

Implementation of these recommendations can proceed with concurrence from Goodyear and EPA.

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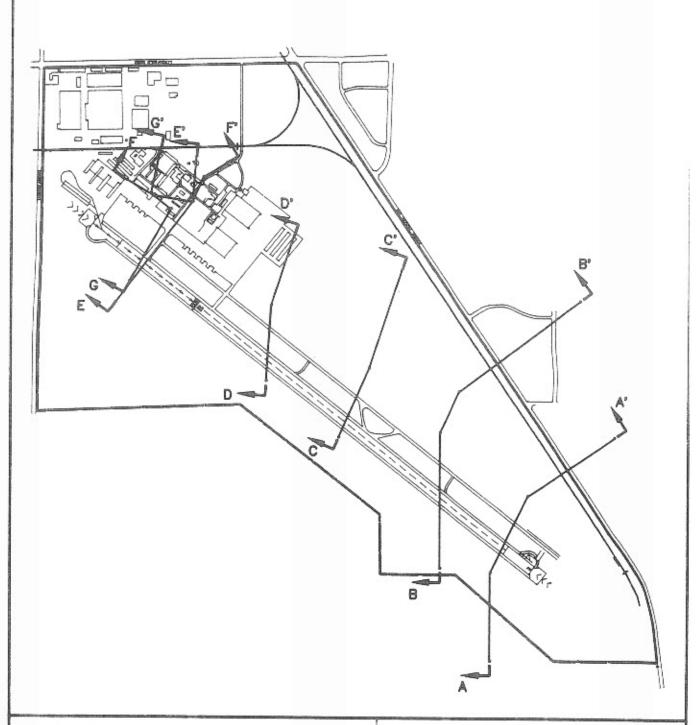
## APPENDIX A Geologic Cross-Sections

JOB NO.: 0000000000

PLOT SCALE: 1=1

STARTED ON: 0/00/00 REVISED: 0/00/00





PHOENIX GOODYEAR SUPERFUND SITE GOODYEAR ARIZONA

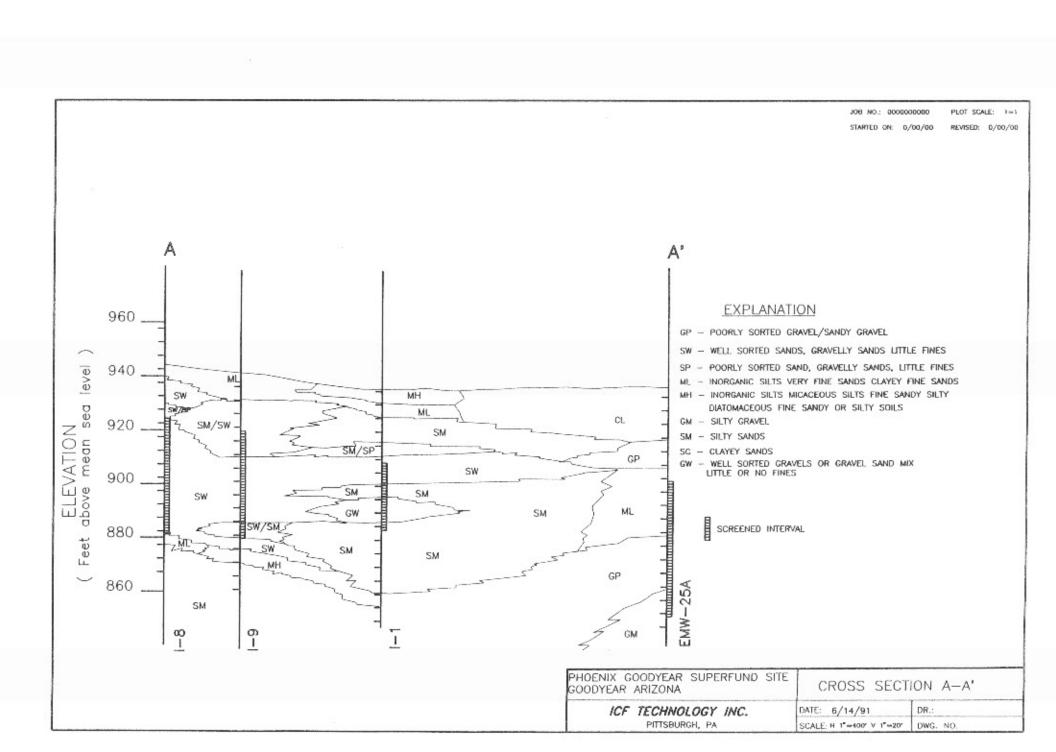
ICF TECHNOLOGY INC.

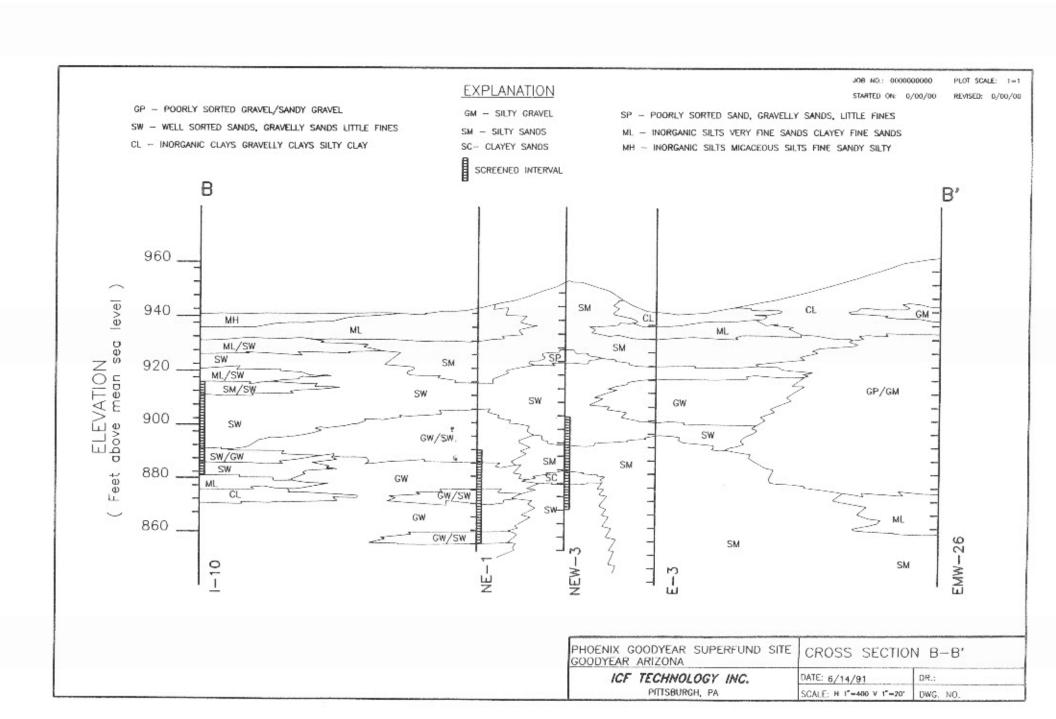
DATE: 6/14/91

DR.: DWG. NO .:

PITTSBURGH, PA

SCALE: 1"=1500'

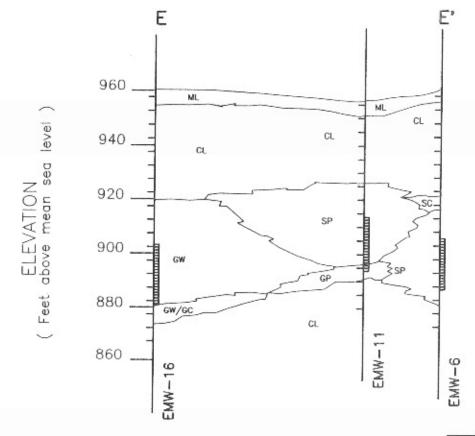




JOB NO.: 0000000000 PLOT SCALE: 1-1 STARTED ON: 0/00/00 REVISED: 0/00/00 **EXPLANATION** C, GP - POORLY SORTED GRAVEL/SANDY GRAVEL SW - WELL SORTED SANDS, GRAVELLY SANDS LITTLE FINES SP - POORLY SORTED SAND, GRAVELLY SANDS, LITTLE FINES 960 ML - INORGANIC SILTS VERY FINE SANDS CLAYEY FINE SANDS MH - INORGANIC SILTS MICACEOUS SILTS FINE SANDY SILTY eve GM - SILTY GRAVEL SM - SILTY SANDS 940 SC - CLAYEY SANDS ELEVATION above mean sea CL CL - INORGANIC CLAYS, GRAVELLY CLAYS, SILTY CLAYS, SANDY CLAYS, MEDIUM/LOW PLASTICITY 920 CH - INORGANIC CLAYS, HIGH PLASTICITY, FAT CLAYS GP SP/CL GW -- WELL SORTED GRAVELS, GRAVEL-SAND MIX, LITTLE OR SM NO FINES SCREENED INTERVAL SP 900 SM/GM Feet <\_GW/SP 880 SW 860 CH EMW. CL. 빞 PHOENIX GOODYEAR SUPERFUND SITE CROSS SECTION C-C' GOODYEAR ARIZONA ICF TECHNOLOGY INC. DATE: 6/14/91 DR.: PITTSBURGH, PA SCALE: H 1"-400" V 1"-20" DWG. NO.

40€ NO.: 00000000000 PLOT SCALE: 1-1 STARTED ON: 0/00/00 REVISED: 0/00/00 D' **EXPLANATION** 960 \_ GP - POORLY SORTED GRAVEL/SANDY GRAVEL - WELL SORTED SANDS, GRAVELLY SANDS LITTLE FINES Feet above mean sea level - POORLY SORTED SAND, GRAVELLY SANDS, LITTLE FINES 940 \_ MH/ML - INORGANIC SILTS VERY FINE SANDS CLAYEY FINE SANDS INORGANIC SILTS MICACEOUS SILTS FINE SANDY SILTY ML-MH GW - SILTY GRAVEL - SILTY SANDS 920 SC - CLAYEY SANDS SCREENED INTERVAL 900 SW GW/CL 880 GM 860 GW/CL EMW-12 SW PHOENIX GOODYEAR SUPERFUND SITE CROSS SECTION D-D' PHOENIX ARIZONA ICF TECHNOLOGY INC. DATE: 6/14/91 DR.: PITTSBURGH, PA SCALE: H 1"=400" V 1"=20" DWG NO

J08 NO.: 0000000000 PLOT SCALE: 1=1 STARTED ON: 0/00/00 REVISED: 0/00/00



#### **EXPLANATION**

GP - POORLY SORTED GRAVEL/SANDY GRAVEL

SW - WELL SORTED SANDS, GRAVELLY SANDS LITTLE FINES

SP - POORLY SORTED SAND, GRAVELLY SANDS, LITTLE FINES

ML - INORGANIC SILTS VERY FINE SANDS CLAYEY FINE SANDS

MH - INORGANIC SILTS MICACEOUS SILTS FINE SANDY SILTY

GM - SILTY GRAVEL

SM - SILTY SANDS

SC - CLAYEY SANDS

CL - INORGANIC CLAYS GRAVELLY CLAYS SILTY CLAY

GW - WELL SORTED GRAVEL, GRAVEL SAND MIX LITTLE OR NO FINES

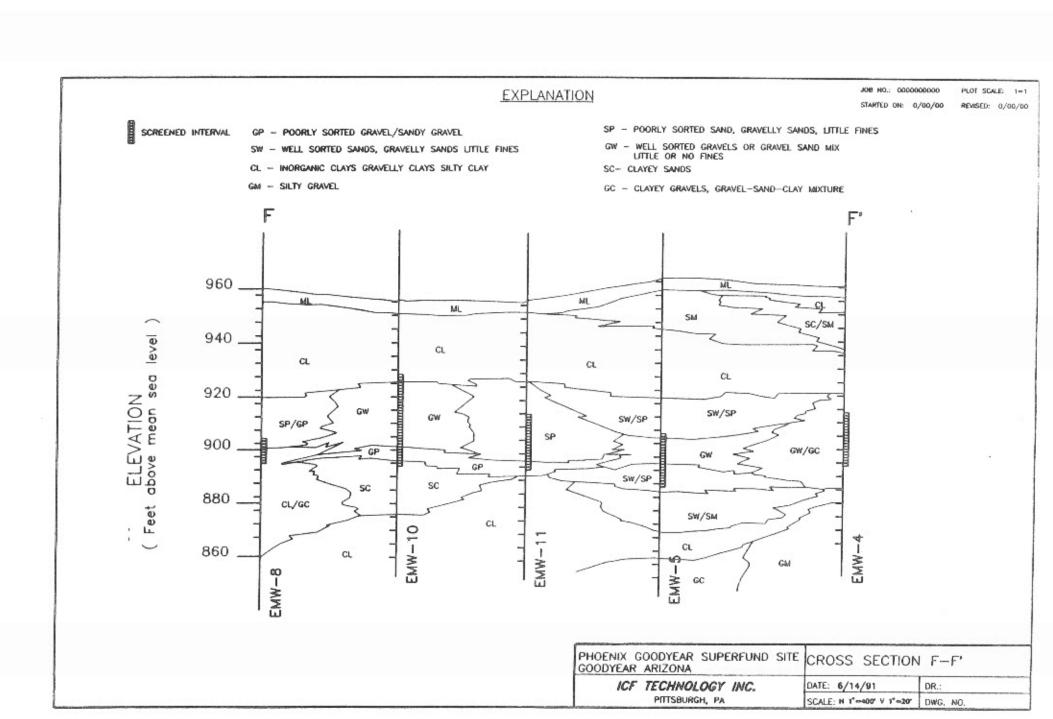
PHOENIX GOODYEAR SUPERFUND SITE CROSS SECTION E-E'

GOODYEAR ARIZONA

ICF TECHNOLOGY INC.

PITTSBURGH, PA

SCALE: # 1"=400" V 1"=20" DWG NO



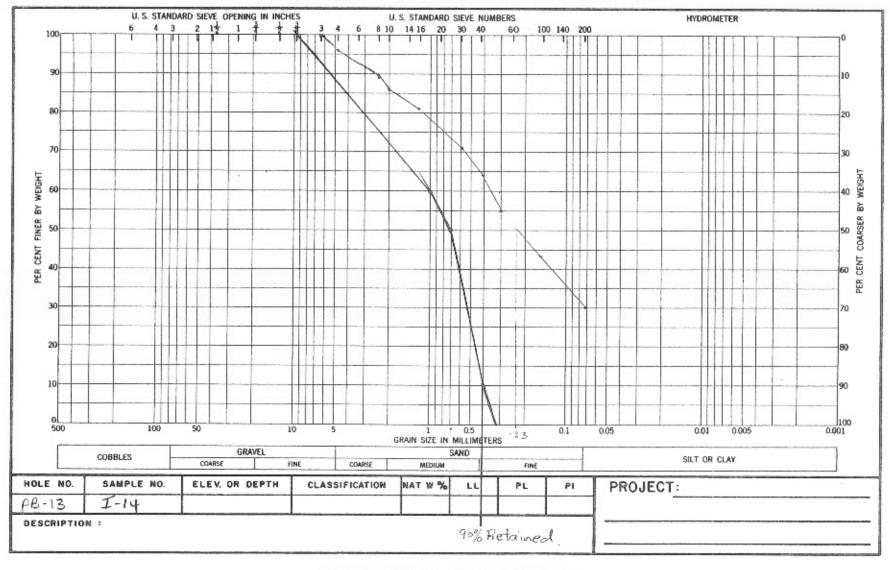
JOB NO.: 00000000000 PLOT SCALE: 1=1 STARTED ON: 0/00/00 REVISED: 0/00/00 G' 960 CL/W ML **EXPLANATION** ELEVATION Feet above mean sea level ) 940 GP - POORLY SORTED GRAVEL/SANDY GRAVEL CL. SW - WELL SORTED SANDS, GRAVELLY SANDS LITTLE FINES CL SP - POORLY SORTED SAND, GRAVELLY SANDS, LITTLE FINES 920 ML - INORGANIC SILTS VERY FINE SANDS CLAYEY FINE SANDS - INORGANIC SILTS MICACEOUS SILTS FINE SANDY SILTY - SILTY GRAVEL - SILTY SANDS 900 SC - CLAYEY SANDS SCREENED INTERVAL SP/SC 880 860 PHOENIX GOODYEAR SUPERFUND SITE CROSS SECTION G-G' GOODYEAR ARIZONA DR .: ICF TECHNOLOGY INC. DATE: 6/14/91

PITTSBURGH, PA

SCALE: H 1"-400" V 1"-20"

DWG. NO.

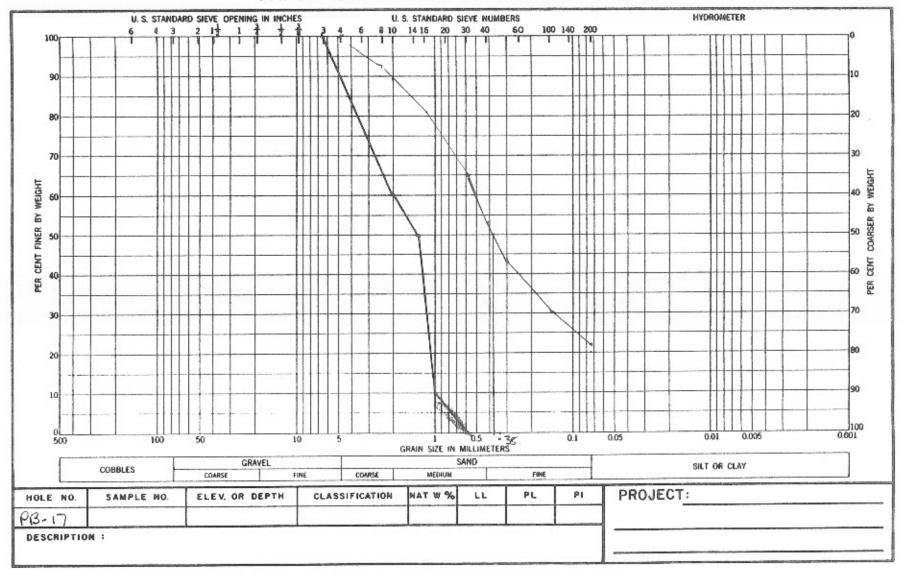
### APPENDIX B Grain Size Analysis



ICF KAISER ENGINEERS

DWG. NO.:

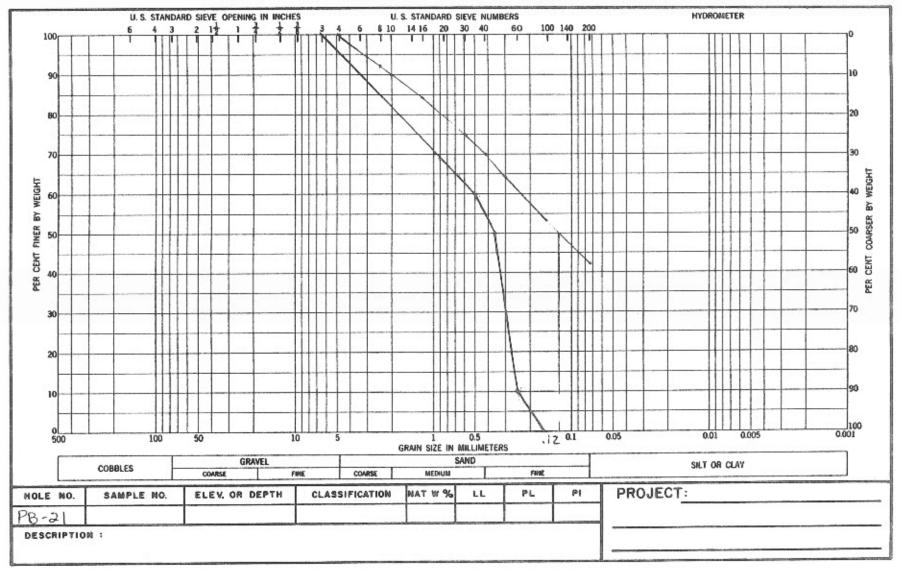
D50 - 23



ICF KAISER ENGINEERS

DWG. NO.:

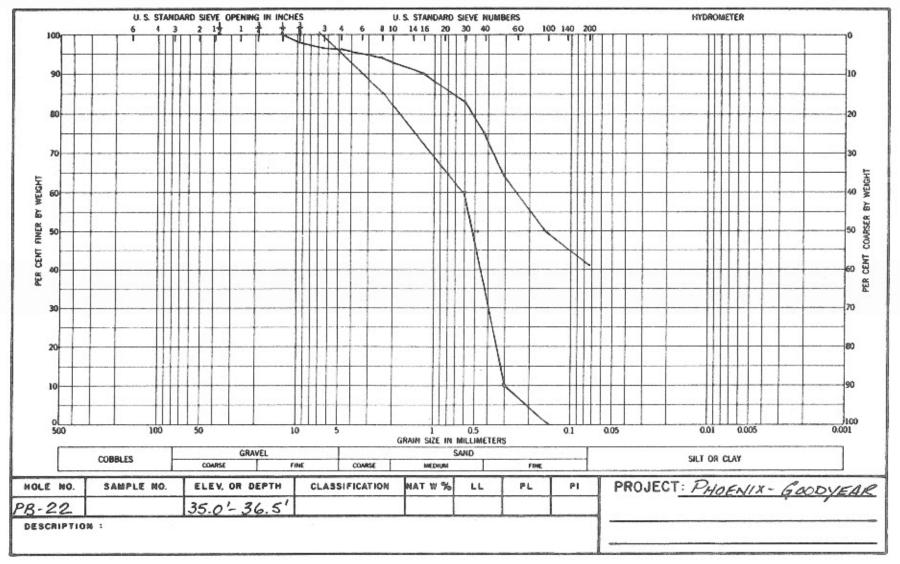
D50 = . 38



ICF KAISER ENGINEERS

DWG. NO.:

90% Retained = . 0098

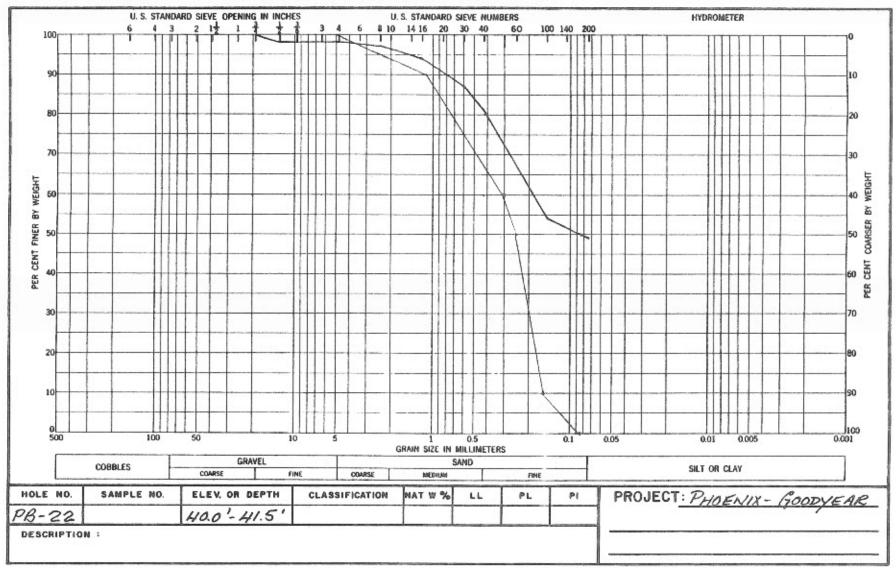


ICF KAISER ENGINEERS

DWG. NO.:

D50 = 16 mm

Gnd/721. 1 .110.

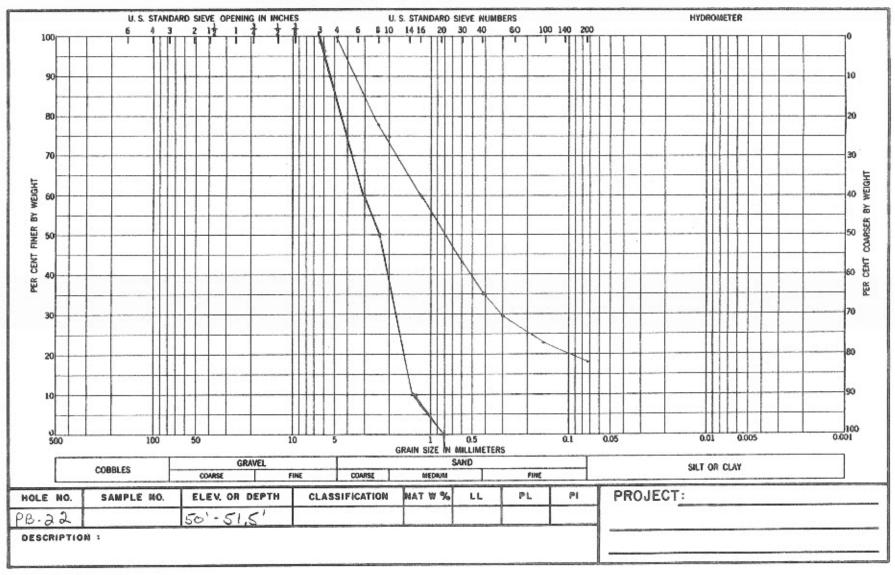


ICF KAISER ENGINEERS

DWG. NO.:

D50 = -084 mm

90% Retained - 0059 inches

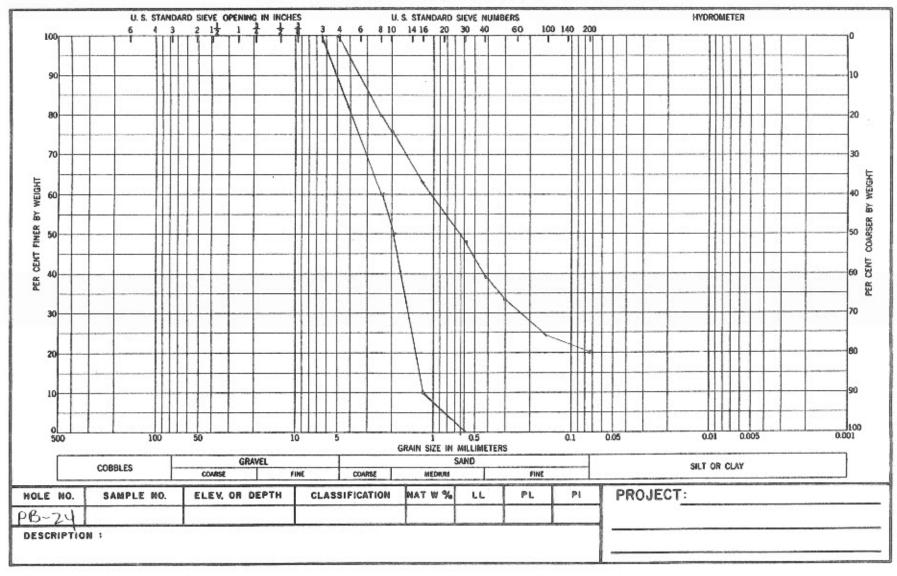


ICF KAISER ENGINEERS

DWG. NO.:

Ds0 = -8

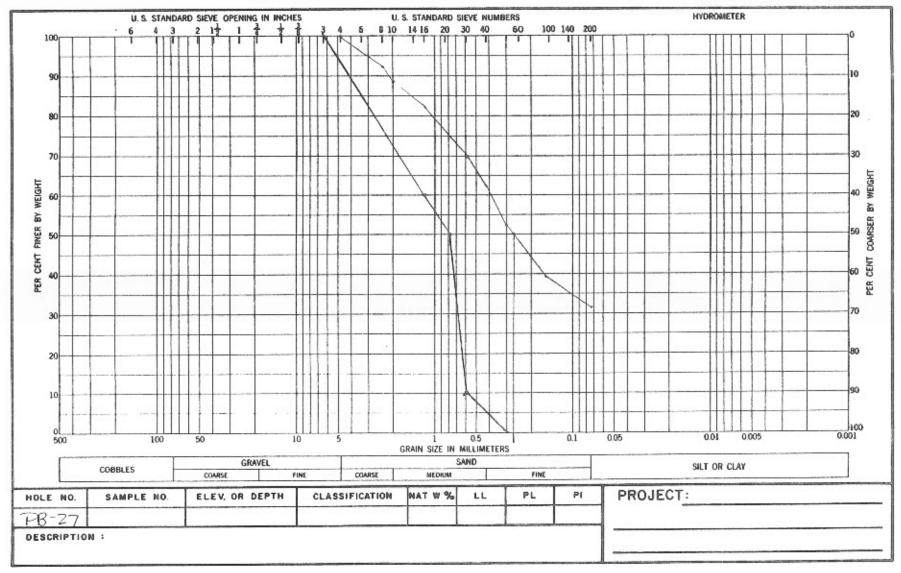
90% Retained = . 059



ICF KAISER ENGINEERS

DWG. NO.:

90% Retained = .0465 inches

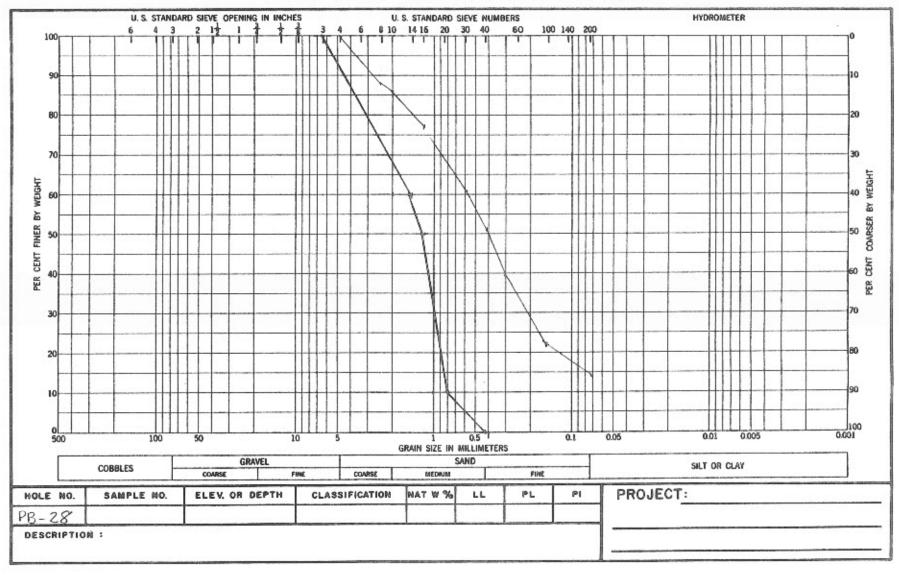


ICF KAISER ENGINEERS

DWG. NO.:

Ds0 = .26

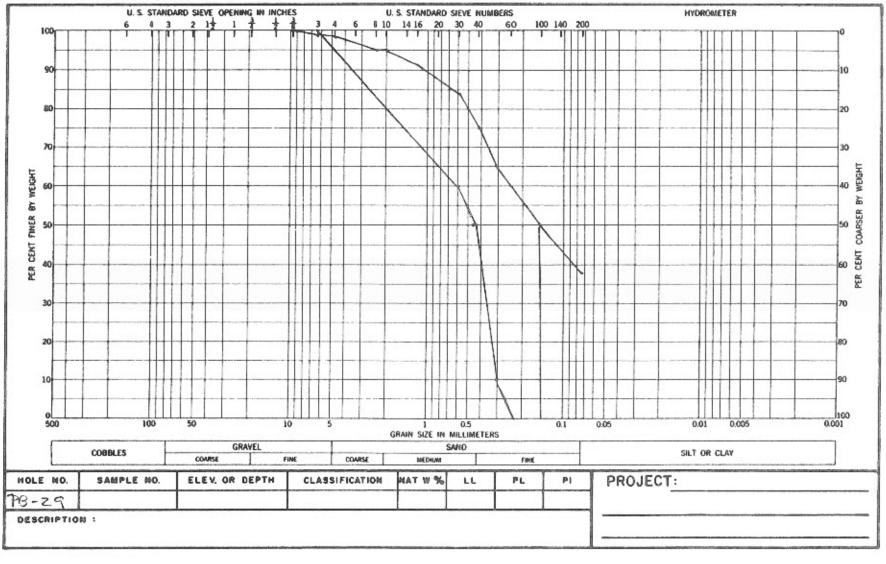
and 1 - 1 - 1



ICF KAISER ENGINEERS

DWG. NO.:

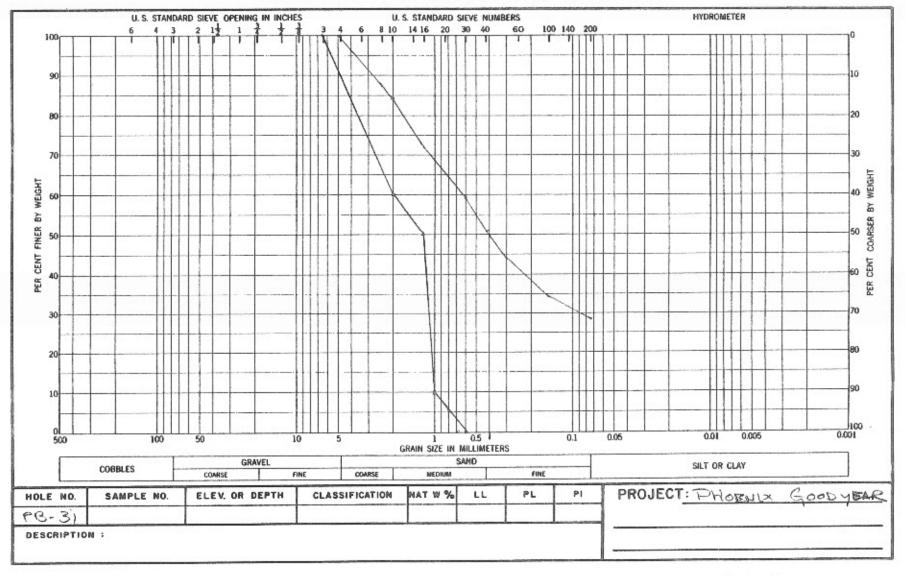
D50 = .4



ICF KAISER ENGINEERS

DWG. NO.:

90% Retained = .0118



ICF KAISER ENGINEERS

DWG. NO.:

050=.4mm 90% Rotained = .0393.

### APPENDIX C Soil Boring Logs

## ICF KAISER ENGINEERS

# BORING LOG

Project name Goodyear Tire & Rubber Co. Project No. 03761-005-00  Location Goodyear, Arizona - PGA Site  Drilling Firm Heber Mining Co. Water Levels: Depth Elevation Time/D  Drilling Method Hollow Stem Auger  Hollow-Stem Auger O.D. 8" I.D. 3 1/4" After Drilling 56.8' 07000/5-1  Rotary Bit Dia. N/A Casing Dia. N/A Well Level  Total Boring Depth 106.5 ft. Depth Measured Relative To Grade  CALE SAMPLE MATERIAL DESCRIPTION OVA(1)  No samples collected from 0-20 ft. Mainly silts, sands, and gravels.	0 <u>ate</u> 10-91	Sheet_ G.S. El Casing Start ( Finish Logged	1 of 4 lev.
Drilling Method Hollow Stem Auger  Hollow-Stem Auger O.D. 8" I.D. 3 1/4" After Drilling 55.0" 0700/5-1  Rotary Bit Dia. N/A Casing Dia. N/A  Total Boring Depth 106.5 ft. Depth Measured Relative To Grade  CALE SAMPLE IN DEPTH SPT BLOWS REC. PID or RANGE per 6 in. OVA(1)  No samples collected from 0-20 ft	0-91	G.S. El Casing Start ( Finish Logged	Elev Elev Date <u>5/09/9</u> Date 5/10/9
Drilling Method Hollow Stem Auger  Hollow-Stem Auger O.D. 8" I.D. 3 1/4" After Drilling 55.0" 0700/5-1  Rotary Bit Dia. N/A Casing Dia. N/A  Total Boring Depth 106.5 ft. Depth Measured Relative To Grade  CALE SAMPLE IN DEPTH SPT BLOWS REC. PID or RANGE per 6 in. OVA(1)  No samples collected from 0-20 ft	0-91	Casing Start ( Finish Logged	Elev Date <u>5/09/9</u> Date <u>5/10/9</u>
Rotary Bit Dia. N/A Casing Dia. N/A   Well Level	0-91	Start (Finish Logged	Date <u>5/09/9</u> Date <u>5/10/9</u>
Rotary Bit DiaN/A_ Casing DiaN/A         Well Level           Total Boring Depth106.5 ft.         106.5 ft.         Depth Measured Relative To Grade           CALESAMPLEINDEPTHSPT_BLOWS_RECPID_orOVA(1)         MATERIAL_DESCRIPTION OVA(1)           No samples collected from 0-20 ft		Finish Logged	Date5/10/9
Total Boring Depth		Logged	
CALE SAMPLE IN DEPTH SPT BLOWS REC. PID or RANGE per 6 in. OVA(1)  No samples collected from 0-20 ft		итн.	
EET RANGE per 6 in. OVA(1)  No samples collected from 0-20 ft	TIME	LITH. SECT.	
No samples collected from 0-20 ft. Mainly silts, sands, and gravels.		1	WELL CONSTRUCTION
10			
20 20.0-21.5 21-14-16 1.5 0 SM - Gravelly siity SAND: br.; 40% fine to coarse sand, poorly sorted, subang. to subrnd.; 40% silt; 20% gravel.		SM	
25   25.0-26.5   31-29-28   1.0   0	0545	SM	
30.0-31.5 34-29-28 1.5 0 GM - Silty sandy GRAVEL: br.; 40% gravel, ang. to subang., variable mineral composition; 30% sand, same as sample 20.0-25.0 ft.; 20% silt.	0600	GM	-
35			-
DTES:			

Pr	oject nam	<b>e</b> Goodyear	Tire	& Rubber	Co. Project No. 03761-005-00	Boring	No. PB-13/
		Goodyear				1	2_ of _4_
Dri	illing Firm	Heber Mi	ning C	Co.	Water Levels: Depth Elevation Time/Date		iv.
		od Hollow S				1	Elev.
Но	llow-Stem	Auger O.D	. 8"	_I.D3_1	/4" After Drilling 56.8' 1000/5-10-9		ate <u>5/09/9</u> 1
		ia. <u>N/A</u> 0				1	ate5/10/91
Tot	tal Boring	Depth	106,5	ft.	Depth Measured Relative To Grade		By_Barner
SCALE		SAMPLE				-	,
IN FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PiD or OVA(1)	MATERIAL DESCRIPTION TIME	LITH. SECT. C	WELL ONSTRUCTION
	A STATE OF THE PARTY OF THE PAR	15-29-12	1.0	0	SW - SAND with trace silt: redbr.; 95%	SW	
-				ppm	sand, fine to coarse grained, poorly to mod. well sorted, subang. to subrnd.; 5% silt.		-
40 	40.0-41.5	18-24-34	1.0	O ppm	SW — Gravelly SAND: redbr.; 70% sand, as previous sample; 30% gravel, up to 1.25" ang. to subrnd.	SW	
- 45 -	45.0-46.5	28-34-44	1.0	0 ppm	- GM — Silty sandy GRAVEL: red.—br.; 60% gravel, up to 1.25° in dia., ang. to subang.; 20% sand. as previous sample; 20% silt.	GM	-
-50 -50	50.0-51.5	22-12-16	1.5	0 ppm	- GW — Hit gravel zone up to 2" ni dia. spoon sample: clayey gravelly SAND: SW/SC — 40% sand, v. fine to fine grained, well sorted; 30% clay, br.; 20% gravels; 10% silt.	GW SW/ SC	-
-55	55.0-56.5	12-27-30	1.0	O ppm	- SW — Silty gravelly SAND: red.—br.; 85% sand, coarse grained, well sorted, subang, to subrnd., variable mineral composition: quartz, feldspars, ferromagnesium minerals; 10% gravel, variable mineral compostion; 5% silt.	sw	-
-60	60.0-61.5	10-14-20	1.5	O ppm	- ML — SILT: red.—br.; firm, moist.	ML	_
-65	65.0-66.5	10-19-35	1.3	Oppm	- ML — Clayey sandy SILT: redbr.; 40% silt; 30% sand, fine grained; 15% clay; 5% gravel.	ML	
70				-			]
70 NOTES	. UNIV. h				5.540.40		
10100	ning bdc	kground = 0	.u ppr	n @ 064	5 5/10/81.		

Pr	oject nam	<b>e</b> Goodyea	r Tirə	& Rubbe	Co. Project No. 03761-005-00	Boring No. PB-13/
Lo	cation	Goodyea	r. Arizo	na - Po	A Site	Sheet 3 of 4
Dri	illing Firm	Heber M	ining C	co.	Water Levels: Depth Elevation Time/Date	G.S. Elev.
Dri	illing Meth	od Hollow S	item A	uger	During Drilling _55.0'0700/5-10-91	
Но	llow-Stem	Auger O.D	. 8"	1.0.3	/4" After Drilling	
		ia. <u>N/A</u> (				Finish Date 5/10/9
Tot	tal Boring	Depth	106,5	ft.	Depth Measured Relative To Grade	Logged By Barner
SCALE		SAMPLE				
FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION TIME	LITH. WELL SECT. CONSTRUCTION
	70.0-71.5	10-19-25	1.5	0 ppm	CL - Upper 1.0 ft. sandy CLAY: red,~br.;	CL
-				PPIII	85%clay, stiff, plastic; 15% sand; v. fine gravel.	sw
-					SW - Lower 0.5 ft.: 90% sand; 5% gravel; 5% silt.	
-						
-75	75.0-76.5	7-7-16	1.5	0 mag	SW - SAND: redbr.; 95% sand, coarse to	sw -
-				ppin	fine grained, mod. well sorted, subang, to subrnd.; 5% silt.	
						-
-80	80.0-81.5	10-10-25	1.5	0	-SW - SAND: similar to above sample; 90%	
-				ppm	sand, med. to coarse grained, mod. well sorted, subang. to ang.; 5% gravel; 5% clay.	SW
-						
-				-		
74						-
- 85	85.0-86.5	23-15-40	1.5	ppm	-SW - As above sample (80.0-81.5).	SW -
-						
-						
-90	90.0-91.5	14-19-20	1.5	0	SW - As above except greater percentage of	sw _
-				ppm	gravel (10%); and clay (10%).	-
- S						-
						-
-95	95.0-96.5	11-17-22	1.0	0	SW to show what same (67)	
-	00.0 00.0	11-17-22	1.0	ppm	-SW - As above, except gravels (5%); clay (5%)	SW -
-				1		
-				+		
-				+		
100	100.0- 101.5	14-19-22	1.5	0 ppm	SM — Silty SAND: reddish br.; 85% sand — description as previous sample; 15% silt.	SM -
					The second semple, Total sec.	1
		2				
-						
105						
NOTES	:					

Pro	oject nam	● Goodyear	Tire d	& Rubber	Co. Project No. 03761-005-00		Boring No.PB-13/
		Goodyear					Sheet 4 of 4
1					Water Levels: Depth Elevation Time,	/Date	G.S. Elev
					During Drilling 55.0' 0700/5		Casina Fley
Ho	llow-Stem	Auger O.D.	. 8"	I.D. 3 1	/4" After Drilling56.8'1000/5	-10-91	Start Date 5/09/91
Rot	tary Bit D	ia. N/A C	asing	Dia. N	A Well Level		Finish Date 5/10/91
Tot	al Boring	Depth	106.5	ft.	Depth Measured Relative To Grade		Logged By Barner
SCALE		SAMPLE					
IN FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION	TIME	LITH. WELL SECT. CONSTRUCTION
	105.0- 106.5	10-12-16	1.5	0 ppm	SW — SAND: red.—br.; 95% sand as previous sample; 5% silt.		sw
-				-	Bottom of boring @ 106.5 ft.		
-				-	22 No. 10 No.		
				1			
110				T	•		-
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NOTES	:						
				UNCES I			

Pr	oject nam	<ul> <li>Goodyear</li> </ul>	Tire	& Rubber	Co. Project No. 03761-005-00		Boring	No. P8-14	
Lo	cation	Goodyear	, Arizo	na – PG	A Site		Sheet 1 of 3		
Dri	illing Firm	Heber Mi	ning C	o.	Water Levels: <u>Depth</u> <u>Elevation</u> Time	/Date		lev	
Dri	illing Meth	od Hollow S	tem Au	iger	During Drilling	-16-91	Casing Elev.		
Ho	llow-Stem	Auger O.D.	. 8"	_1.D3				Date 5/16/9	
Ro	tary Bit D	ia. <u>N/A</u> C	asing	Dia N/	A Well Level			Date5/16/9	
Tot	tal Boring	Depth	89.0	ft.	Depth Measured Relative To Grade		Logge	By J. Moore	
SCALE		SAMPLE				T			
FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION	ПМЕ	SECT.	WELL CONSTRUCTION	
5 - 10 -	10.0-11.5		1.5		-ML — Clayey sandy SILT; br., 90% silt, non—plastic to v. low plasticity; 5% clay; 5% sand, med. to fine grained sands, mod. to well sorted; dry.	< 1130	ML		
20  -	20.0-21.5	18-26- 50/.4	1.0	o bbiw	- SW/ML — Silty gravelly SAND: br.; 20%silt; 50% sand, coarse to mostly fine sands; 30% gravels, subang. to subrnd.; poorly sorted grading to sandy SILT; It gray; 95% silt; non—plastic; 5% sand; med. to fine sands; dry	< 1142	SW/ ML	-	
25  -	25.0-26.5	32-24-21	1.5	0 ppm	ML/SW — Sandy SiLT: red-br.; 95% silt,non—plastic, firm; 5% sand, med. to mostly fine sands; grading to gravelly SAND: yellowish-br.; 85% sand, coarse to fine mostly med. sands; 15% gravels, v. ang. to subang.; poorly sorted, streambed deposits; dry.	< 1152	ML/ SW	-	
-30   -35 NOTES		22-32-28	1.5	o ppm	SW/ML/SW — Gravelly SAND: br.; 95% sand, coarse to fine grained; 5% gravels, well rnd. to submd. (30-30.5) sandy SILT; dull br.; 95% silt, non-plastic; 5% sand, med. to fine grained, mod. sorted, firm, moist to dry (30.5 -30.9) grading to gravelly SAND; lt. br.; 90% sand, coarse to fine grained, mica present, subang. to submd.; 10% gravels; med. to mostly fine subrnd. to subang., mod. sorted, moist.	< 1200	SW/ ML/ SW	-	

Ho:	llow-Stem tary Bit Di al Boring	Heber Mi  od Hollow St  Auger O.D.  ia. N/A C  Depth  SAMPLE	tem Au 5°	_1.D3" _DiaN	During Drilling	-16-91	Casing Start ( Finish	Elev Date <u>5/16/</u> Date <u>5/16/</u> I By J. Mod
IN	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION	TIME	LITH. SECT.	WELL CONSTRUCTI
	-	18-21-20	1.2	0 ppm	SW — Gravelly SANDS; dk. br. to br.; 85% sand coarse to fine, mostly med. sands; 25% gravels, rnd. to subang., med. to fine gravels, hard; dry to moist.	< 1209		
40	40.0-41.5	19-50/6"	0.9	0 ppm	— SW — Gravelly SANDS: br.; 75% sand, coarse to fine sands, mostly med.; 25% gravels, med. to mostly fine ang. to subrnd. gravels; hard, poorly sorted; dry to moist.	< 1215	SW	
45	45.0-46.5	23-50/6*	1.0	0 ppm	- GM/GP - SILT and GRAVEL: dk. br.; 50% silt, non-plastic; 50% gravel, coarse to fine, ang. to subang. gravels; grading to sandy GRAVEL: br.; 10% sand, coarse to fine sands; 90% gravels, coarse to fine, v. ang. to subang. gravels, poorly sorted; dry	< 1232	GM/ GP	
50	50.0-51.5	50/€"	0.5	O ppm	GP — Sitty sandy GRAVELS; gray—br.; 10% sitt, non—plastic; 10% sand, coarse to fine grained; 80% gravels, coarse to fine, subang. to v. ang. rock frag./gravels, mod. sorted streambed deposits; wet.	1	GP * wet @ 50.5	
55	55.0-56.5	21-50/2*	0.5	O ppm	-GP - Same as above (50.0-51.5): except gravel content (85%); sand (10%); and silt (5%); wet.	< 125 <del>4</del>	GP	
50	60.0-61.5	50-34-30	1.5	O ppm	-GP - Same as @ 50.0-51.5 (60.0-60.5) - ML - (60.5-61.5) Clayey sandy SILT: red-br.; 80% silt, non-plastic to v. low plasticity; 15% sand, med. to mostly fine sands; 5% clay, mod. sorted, moist to wet.	< 1306	GP/ ML	
55	65.0~66.5	24-33-136	0.9	O ppm	-SM/HL — Clayey silty SAND: br.; 45% silt, non-plastic; 50% sand, med. to mostly fine sands; 5% clay, mod. sorted; moist	< 1320	SM/ HL	

Dorilling Firm   Helber Mining Co.   Water Levels:   Depth   Elevation   Time/Date   C.S. Elev.	Pro	oject name	<b>8</b> Goodyear	Tire	& Rubbe	r Co. Project No. 03761-005-00		Boring	NoPB-14
Drilling Firm	1								
During   Drilling   Method   Hollow Stem Auger   During   During   Drilling   S5.0°   1215/5-16-91   Cosing Elev.	Dri	lling Firm	Heber Mi	ning C	Co.	Water Levels: Depth Elevation Time	/Date		
Hollow-Stem Auger 0.D. 8'   1.D. 3'   After Drilling   Start Date 5/16/91   Total Boring Depth   89.0 ft.   Depth Measured Relative To   Grade   Degade   By J. Moore   Depth   SPT BLOWS   REC.   PID or   PID   PID	Dri	iling Metho	d Hollow S	tem A	uger				
Rotary   Bit   Dia   N/A   Casing   Dia   N/A   N/A   Beyl   Level   Depth   Measured   Relative To   Grade   Grade   Logged   By J. Moore	Но	llow-Stem	Auger O.D.	. 8"	_I.D	-W 1.41 - D 1111	1		
Total Boring   Depth   89,0 ft.   Depth   Measured Relative To   Grade   Logged By J. Mocre	Ro	tary Bit Di	ia. N/A C	asing	Dia N				
SAMPLE   SAMPLE   No.   DEPTH   SPT   BLOWS   REC.   PID or OVA(1)   No.   Piper   Piper   Pine   No.   Piper   Pine   No.   Piper   Pine   Piper   Pine   Piper   Pine   Piper   Pine   Piper   Pip	Tot	al Boring	Depth	89.0	ft.	Depth Measured Relative To Grade			
N   DEPTH   SPT BLOWS   REC.   PID or OVA(1)	SCALE		SAMPLE					Loggod	Oy c. Moore
70.0-71.5   12-14-18   0.7   0   ppm   SM - Grovelly silty SAND: br.; 25% silt, non-plastic; 60% sand, coarse to fine grained; 15% gravels, med. to fine, subrnd. to subrng.; wet.   1330   SM   SP   SN   SN   SP   SN   SN   SN   SN		DEPTH	SPT BLOWS	REC.		MATERIAL DESCRIPTION	TIME	LITH. SECT. C	WELL ONSTRUCTION
Ppm		70.0-71.5	12-14-18	0.7	0	plastic; 60% sand, coarse to fine grained; 15% gravels, med. to fine, subrnd. to suband.:	< 1330		-
SM/SP - Same as above (see 75.0-70.0)	75  -	75.0-76.5	14-19-20	0.3	8	non—plastic; 70% sand, coarse to fine sands, mostly med. grained; 15% gravels, med. to fine, rnd. to subrnd. gravels, poorly sorted:	< 1338		-
SW - Sitty gravely SAND: red-br.; 5% sitt non- < 1409 SW ppm picstic; 75% sand, dominantly coarse to fine sands; 20% gravels, and. to subrnd., coarse to fine gravels; wet.  SW - Sitty gravely SAND: br.; 5% sitt; 60% sand, coarse to fine grained, mostly med. sands; 35% gravels, coarse to fine, ang. to subrnd. gravels; wet.  Bottom of boring 989.0 ft.	-80 -	80.0-81.5	8-11-12	0.4	- 1	except 65% sand; 25% silt; 10% med, to fine	< 1357		-
ppm sand, coarse to fine grained, mostly med. sands; 35% gravels, coarse to fine, ang. to subrnd. gravels; wet.  Bottom of boring 89.0 ft.	- 85 -	85.0-86.5	7-7-6	0.3		sands; 20% aravels, and, to subrad, coarse to	< 1409	sw	_
Bottom of boring ® 89.0 ft.	-00	88.0-89.0	50/6"	0.2		sand, coarse to fine grained, mostly med.	< 1428	sw	-
	-30								-
	-95								-
	700								-
NOTES: * Cobbles and boulders @ a depth of 88 ft. caused auger refusal.	105								

Drilling Firm			e Goodyear Goodyear			o. Project No. 03761-005-00 Site			No. PB-15	
Drilling   Method   Hollow Stam Augar   During Drilling   55.0'   0615/5-13-91   Casing Elev.							/Date			
Hollow-Stem Auger O.D. g* 1.0.3 1/4"   After Drilling   51.0"   1000/5-13-91   Start Date 5/10/5   Rotory Bit Dia_N/A   Casing Dia_N/A   Well Level   Depth Measured Relative To Grade   Depth Dote 5/13/5   Logged By Borner   Start Date 5/10/5   Finish Date5/13/5   Logged By Borner   Start Date 5/13/5   Logged By Borner   LiTH   WELL   LITH   WELL   Start Date 5/13/5   Logged By Borner   LiTH   WELL   LITH   LITH   WELL   LITH   WELL   LITH   LITH   WELL   LITH   LITH   WELL   LITH   LITH   WELL   LITH   LITH   LITH   WELL   LITH   LITH   WELL   LITH   LI										
Rotary Bit Dia. N/A   Casing Dia. N/A   Well Level   Depth Measured Relative To Grade   Capide   Cap										
Depth   Sample   SECT. CONSTRUCTION   TIME   LITH.   WELL   SECT. CONSTRUCTION   SAMPLE   SECT. CONSTRUCTION   SECT. CONSTRUCTION   SAMPLE   SECT. CONSTRUCTION   S										
No.   DEPTH   PANGE   PID   Or   Popth   PEET   PID   Or   Popth   PEET   Popth   Per 6 in.   Popth   Popth										
FEET RANGE per 6 in. OVA(1)  No samples collected from 0-10 ft. Cuttings predominantly sands, slits, and gravels.  No samples collected from 0-10 ft. Cuttings predominantly sands, slits, and gravels.  No samples collected from 0-10 ft. Cuttings predominantly sands, slits, and gravels.  No samples collected from 0-10 ft. Cuttings predominantly sands, slits, and gravels.  No samples collected from 0-10 ft. Cuttings predominantly sands, slits, and gravels.  No samples collected from 0-10 ft. Cuttings predominantly sands, slits, and gravels.  NL SILT with few gravels: it. redbr.; 50% send;  SM Silt, 5% gravel.  NL SILT with few gravels: it. redbr.; 50% send;  SM Silt, stiff, brittle.  SM Silt, stiff, brittle.  NL Sandy clovey SILT: gravish br.; 40% silt, 40% clay; 20% sand, v. fine grained.  NL Sandy clovey SILT: gravish br.; 40% silt, 40% clay; 20% sand, v. fine grained.  NL Sandy clovey SILT: gravish br.; 40% silt, 40% clay; 20% sand, v. fine grained, few gravels (<5%)  NL Sandy clovey SILT: gravish br.; 40% sand, v. fine grained, few gravels (<5%)  NL Sandy clovey SILT: gravish br.; 40% sand, v. fine grained, few gravels (<5%)  NL Sandy clovey SILT: gravish br.; 40% sand, v. fine grained, few gravels (<5%)  NL Sandy clovey SILT: gravish br.; 40% sand, v. fine grained, few gravels (<5%)  NL Sandy cloves SILT: gravish br.; 40% sand, v. fine grained, few gravels (<5%)  NL Sandy cloves SILT: gravish br.; 40% sand, v. fine grained, few gravels (<5%)  NL Sandy cloves SILT: gravish br.; 40% sand, v. fine grained, few gravels (<5%)  NL Sandy cloves SILT: gravish br.; 40% sand, v. fine grained, few gravels (<5%)  NL Sandy cloves SILT: gravish br.; 40% sand, v. fine grained, few gravels (<5%)  NL Sandy cloves SILT: gravish br.; 40% sand, v. fine grained, few gravels (<5%)				1000		MATERIAL DESCRIPTION		LITU	4(5)	
Cuttings predominantly sands, silts, and gravels.				REC.		MATERIAL DESCRIPTION	TIME	SECT.	CONSTRUCTION	
ppm 95% silt; 5% gravel. 1245 ML  -15 15.0-16.5 15-19-24 1.5 0 SM - Silty SAND; it. redbr.; 50% sand; 50% silt, stiff, brittle. 1300 SM  -20 20.0-21.5 9-10-12 1.5 0 ML - Sandy clayey SILT: grayish br.; 40% silt; 40% clay; 20% sand, v. fine grained. ML  -25 25.0-26.5 9-14-12 1.0 0 ML - Clayey SILT: As sample 20.0-25.0 ft. in upper 0.25' of sample, (Lower 0.6 ft. of sample.) SW - SAND; v. fine to fine grained, few gravels (<5%) SW  -30 30.0-31.5 23-27-23 1.0 0 ppm fine to coarse, ang. to subrnd; 10% gravel; 1325 SW	- - - - 5					No samples collected from 0-10 ft. Outlings predominantly sands, silts, and gravels.			-	
ppm 50% slit, stiff, brittle. 1300 SM  20.0-21.5 9-10-12 1.5 0 ppm ML - Sandy clayey SILT: grayish br.; 40% slit; 40% clay; 20% sand, v. fine grained.  ML - Clayey SILT: As sample 20.0-25.0 ft. in upper 0.25' of sample, (Lower 0.6 ft. of sample.) SW - SAND: v. fine to fine grained, few gravels (<5%)  SW - Silty gravelly SAND: redbr.; 80% sand, fine to coarse, ang. to subrnd.; 10% gravel;	_10	10.0-11.5	13-13-10	1.5	o ppm 9	IL — SILT with few gravels: It. red.—br.; 5% silt; 5% gravel.	1245	ML.		
25.0-26.5 9-14-12 1.0 0 ML - Clayey SILT: As sample 20.0-25.0 ft. in upper 0.25' of sample, (Lower 0.8 ft. of sample.) SW - SAND: v. fine to fine grained, few gravels (<5%)  SW  SW  SW  Silt; 40% clay; 20% sand, v. fine grained.	-15	15.0~16.5	151924	1.5	0 — S	M — Silty SAND: it. red.—br.; 50% sond; 0% silt, stiff, brittle.	1300	SM		
ppm upper 0.25' of sample, (Lower 0.6 ft. of sample.) SW — SAND: v. fine to fine grained, few gravels (<5%)  SW  SW  SW  SW  SW  SW  SW  SW  SW  S	-20	20.0-21.5	9-10-12	1.5	O M	IL — Sandy clayey SILT: grayish br.; 40% ilt; 40% clay; 20% sand, v. fine grained.		ML		
ppm fine to coarse, ang. to subrnd.; 10% gravel;	- 25	25.0-26.5	9-14-12	1.0	ppm u	pper 0.25' of sample, (Lower 0.6 ft. of ample.) SW — SAND: v. fine to fine grained.			-	
	-30	30.0-31.5	23-27-23	1.0	ppm fi	ne to coarse, ang. to subrnd.; 10% gravel;	1325	sw	_	
					t					
35	35									

Pr	oject name	<b>G</b> oodyear	r Tire	& Rubbe	r Co. Project No. 03761-005-00		Boring	No. PB-15
Lo	cation	Goodyear	r, Arizo	na – Po	GA Site		Sheet	2 of 4
Dri	illing Firm_	Heber Mi	ining C	о	Water Levels: <u>Depth</u> <u>Elevation</u> Time/	Date		lev
Dri	illing Metho	d Hollow S	tem A	iger	During Drilling55.0'0615/5-	-13-91		Elev
Но	llow-Stem	Auger O.D.	8"	_l.D. <u>3</u>	1/4" After Drilling 51.0' 1000/5-	-13-91	Start	Date 5/10/91
Ro	tary Bit Di	ia. <u>N/A</u> C	Casing	DiaN	/A Well Level			Date5/13/91
Tot	tal Boring	Depth	106.5	ft.	Depth Measured Relative To <u>Grade</u>		Logged	By Barner
SCALE	THE RESERVE OF THE PARTY OF THE	SAMPLE					T	
FEET	DEPTH RANGE	SPT BLOWS per 6 in.		PID or OVA(1)	MATERIAL DESCRIPTION	TIME	LITH. SECT.	WELL CONSTRUCTION
	35.0-36.5	21-50/.4	1.0	ppm 0	SW — Gravelly SAND: as sample 30.0—35,0 ft. except larger amount of gravel (40%) and only a trace of silt; gravels are ang. to subrnd. variable mineral composition	1340	SW	
<b>-</b> 40	40.0-41.5	23-44-21	1.0	O ppm	- GW - Clayey sandy GRAVEL: It. redbr.; 50% gravei - os previous sample; 40% sand - as previous sample; 10% clay.		GW	-
<b>-</b> 45	45.0~46.5	36-50/.2	1.0	1.0 ppm	GC - Sandy clayey GRAVEL: redbr.; 50% gravel; 20% sand, fine to coarse grained, subang. to subrnd., poorly sorted; 20% clay; 10% silt.		GC	-
- 50 	50.0-51.5	28/50/.3*	1.0	0.4 ppm	GC/GW — Clayey sandy GRAVEL: 40% gravel; 40% sand; 20% clay; sample is similar to 45.0—50.0 ft.		GC/ GW	-
- 55 -	55.0-56.5	14-17-28	1.2	0.4 ppm	ML - Sandy clayey SILT: redbr.; 80% silt; 10% clay; 10% sand, fine grained	0615	ML	
- - 60 -	60.0-61.5	6-9-14	1.5	0.4 ppm	Sample same as 55.0-60.0 ft.		ML	-
- - 65 -	65.065.5	11-15-18	1.5	0.2 ppm	GC — Upper 0.4' clayey GRAVEL: CL — Middle 0.6' silty CLAY: SW — Lower 0.5' SAND: poorly sorted,fine to coarse grained, subang. to subrnd.		GC CL SW	
70 NOTES	2 1341 2							
HOIES	- MNU Dac	kground = 0	J.2 ppr	n				

Docation	Pr	oject name	e Goodyegr	Tire	& Rubber	Co. Project No. 03761-005-00		Boring	NoPB-15
Drilling Firm									
Durling Method   Hollow Stem Auger   O.D. at   D.O. 3   L.D. 3   L/2   After Drilling   S5.0*   0615/5-13-91   Casing Elev.	Dri	illing Firm.	Heber Mi	ning C	o	Water Levels: Depth Elevation Time	/Date	1 N 10 10 10 10 10 10 10 10 10 10 10 10 10	
Hollow-Stem Auger O.D. 8'   1.0.3 1/4'   After Drilling   51.0'   1000/5-13-9'   Start Date 5/10/9   Noll Evel   Total Boring Depth   108.5 ft.   Depth Measured Relative To Grade								37 April 33	
Rotary Sit Dia_N/A_Casing Dia_N/A_Depth   Depth   De	1						-13-91		
Total Boring   Depth   108.5 ft.   Depth Measured Relative To   Grade   Logged By Borner									
SCALE   SAMPLE   SAMPLE   SAMPLE   SAMPLE   SEC.   PID or   PROBLEMS   SEC.   PID or   PID	Tot	tal Boring	Depth	106.5	ft.	Depth Measured Relative To Grade			
North   Sept	SCALE	· [	SAMPLE					- 30	7
Ppm	IN	DEPTH RANGE	SPT BLOWS per 6 in.		OVA(1)		TIME	LITH, SECT.	WELL CONSTRUCTION
Description		70.0-71.5	14-18-17	1.5		SC - Middle 0.5' silty clavey SAND-		SC	
SW — SAND with minor amounts of slit, clay sand, coarse grained with fine-med. mixed, mod. well sorted, subang. to submd.; 5% gravel; 5% slit; 5% clay    —85 85.0-86.5 9-12-12 1.5 0.2   —90 90.0-91.5 6-8-12 1.5 0.2   —90 90.0-91.5 6-8-12 1.5 0.2   —90 90.0-91.5 6-8-12 1.5 0.2   —90 90.0-91.5 6-8-12 1.5 0.2   —90 W — As above sample (80.0-85.0)   —90 90.0-91.5 6-8-12 1.5 0.2   —90 W — SW — Upper 0.5 ft. as above sample GC — Middle 0.5 ft. clayey GRAVEL GC — CL — Lower 0.5 ft. slity CLAY — CL — C	- -75 -	75.0-76.5	8-15-20	1.0		grained, poorly sorted: 30% clay: 10% site		sc	-
SW — As above sample (80.0-85.0)    SW = Sw - Sw = Sw = Sw = Sw = Sw = Sw = Sw	- 80 - - -	80.0-81.5		1.5		and gravel: red.—br.; 85% sand, coarse grained with fine-med. mixed, mod. well sorted, subang. to subrnd.; 5% gravel; 5% silt; 5%		sw	-
ppm GC — Middle 0.5 ft. clayey GRAVEL GC CL — Lower 0.5 ft. silty CLAY GC CL — Lower 0.5 ft. silty CLAY GC CL — Lower 0.5 ft. silty CLAY GC CL — ML — Sandy clayey SILT: red.—br.; 90% silt; 5% clay; 5% sand, fine grained — SM — Silty SAND: red.—br.; 50% sand; 50% silt — SM — Silty SAND: red.—br.; 50% sand; 50% silt — SM — Silty SAND: red.—br.; 50% sand; 50% silt — SM — Silty SAND: red.—br.; 50% sand; 50% silt — SM — Silty SAND: red.—br.; 50% sand; 50% silt — SM — Silty SAND: red.—br.; 50% sand; 50% silt — SM — Silty SAND: red.—br.; 50% sand; 50% silt — SM — SM — Silty SAND: red.—br.; 50% sand; 50% silt — SM — S	- 85 - -	85.0-86.5	9-12-12	1.5		SW — As above sample (80.0—85.0) slightly more silty		SW	-
Depth   5% clay; 5% sand, fine grained   ML   5% clay; 5% sand, fine grained   SM   SM   SM   SM   SM   SM   SM   S		90.0-91.5	6-8-12	1.5	0.2 ppm	GC - Middle 0.5 ft. clayey GRAVEL		GC	-
101.5 ppm 50% silt 50% silt 50% sold;	- -95 -	95.0-96.5	7-8-10	1.0		-ML — Sandy clayey SILT: red.—br.; 90% silt; 5% clay; 5% sand, fine grained		ML	
NOTES: HNu annulus reading @ 0835 - 0.6 ppm.	- - - 100 -		7-9-9	0.7		-SM — Silty SAND: redbr.; 50% sand; 50% silt		SM	-
NOTES: HNu annulus reading @ 0835 - 0.6 ppm			75		F				-
NOTES: HNu annulus reading @ 0635 - 0.6 ppm.	105								-
	NOTES	: HNu annu	lus reading (	063	5 - 0.6	ppm.		-	

Pro	oject nam	e Goodyear	Tire o	& Rubber	Co	Project No	03761-0	05-00		Boring	NoPB-15
1						te					4 of 4
						Water Levels: Depti			/Date		lev
						During Drilling 55.0				Casina	Elev
Ho	llow-Stem	Auger O.D.	. 8"	I.D. 3 1	/4"	After Drilling 51.0	,	1000/5	-13-91	Stort	Date 5 /10 /01
Ro	tary Bit D	iaN/A_C	asing	Dia. N.	/A				- 1		Date 5/13/91
		Depth				Depth Measured Rela					
		Andreas Market Control				Dopar model od Troic	10 010	06		Logge	By Barner
SCALE IN FEET	DEPTH RANGE	SAMPLE SPT BLOWS per 6 in,	REC.	PID or OVA(1)		MATERIAL DESC	RIPTION		ПМЕ	LITH. SECT.	WELL CONSTRUCTION
_	105.0- 106.5	50/.3*	0.7	0.2 ppm	SM	l – As previous sample.				SM	
-					Во	ttom of boring @ 106.5	ft.				
-											
											-
110					-						-
											-
											177
-											-
-115					_						
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21				-							
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-125				-	_						
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140											
NOTES	•										
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Pr	roject nam	<b>G</b> Goodyea	r Tire	& Rubbe	Co. Project No. 03761-005-00		Boring	No. PB-16
Lo	cation	Goodyea	r, Arizo	na – Po	A Site		Sheet	1 of 4
Dr	rilling Firm	Heber M	ining C	òo.	Water Levels: Depth Elevation Time	/Date	G.S. E	lev
Dr	filling Metho	od Hollow S	tem A	uger	During Drilling _45.0'0915/5	-21-91	Casing	Elev
Ho	ollow-Stem	Auger O.D	. 8"	_1.0.3"	After Drilling		Start	Date 5/21/91
Ro	otary Bit D	ia. N/A (	Casing	Dia. N				Date5/21/91
To	tal Boring	Depth	107.0	ft.	Depth Measured Relative To		Logge	d By J. Moore
SCAL		SAMPLE					T	
FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION	TIME	LITH. SECT.	WELL CONSTRUCTION
10	10.0-11.5	7-9-10	0.9	0.4 ppm	- ML/SM — Sandy SILT: dull br.; 65% silt, brittle, non-plastic, bedding plains visible; 35% sand, med. to mostly fine grained, mod. sorted; dry	< 075	O ML/ SM	
-20	20.0-21.5	13-14-15	0.7	0.2 ppm	SW — SAND: br.—gray; 100% sand, coarse to fine grained, mostly med. sands, well graded, well sorted, subrnd. to rnd. grains; dry	< 0807	sw	-
25  	25.0-26.5	22-50/4"	0.6	0.2 ppm	- GM — Silty GRAVEL: br.—gray; 15% silt, non—plastic, slightly brittle; 10% sand, coarse to fine grained; 75% gravel, coarse to fine gravels, mostly fine, subang, to subrad., poorly sorted; dry	< 0516	GM .	-
- -30 - -	30.0-31.5	50/ 4"	0.2	0.0 ppm	- SAME as 25.0-26.5 ft. with 80% GRAVELS: 15% silt; 5% sand; dry to moist	< 0830	GM	-
- 7.0				-				
35 NOTE:	S:					477 100000		

Pr	oject name	e Goodyear	Tire	å: Rubbe	r Co. Project No. 03761-005-00		Boring N	No. PB-16
1		Goodyear						_ of _ 4
Dr	illing Firm_	Heber Mi	ning C	io	Water Levels: Depth Elevation Time	/Date		v
1		od Hollow S						Elev.
Но	llow-Stem	Auger O.D.	. 8"	_1.D. <u>3</u> °				te 5/21/9
Ro	tary Bit Di	ia. N/A C	asing	DiaN				ote5/21/9
To	tal Boring	Depth	107.0	ft.	Depth Measured Relative To Grade			By J. Moore
SCALE		SAMPLE				T	1	,
FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION	TIME	LITH. SECT. CO	WELL INSTRUCTION
	35.0-36.5	28-50/5°	0.7	0.0 ppm	GM — Silty GRAVELS: grayish—br.; 10% silt; non—plastic to v. low plasticity; 5% sand, coarse to fine grained; 85% gravels, coarse to fine, mostly fine gravels, v. ang. to subrnd., poorly sorted; dry to moist.	< 0840	GM	
40  - -	40.0-41.5	14-50/3	0.3	0.2 ppm	GM — Silty GRAVELS: br.; 10% silt, non-plostic to v. low plastic; 90% gravels, coarse to fine, mostly fine subang, to submd., poorly sorted; moist.	< 0855	GM	_
- -45 -	45.0-46.5	28-50/2"	0.3	0.4 ppm	- -SAME as 40.0-41.5; wet ❷ 45.0 ft -	< 0915	GM	
-50 -	50.0-51.5	8-16-12	0.9	0.0 ppm	- 	< 0925	GW/ ML	-
-55 -	55.0-56.6	11-16-14	0.8	0.0 ppm	—SW — Gravelly, silty SAND: red.—br.; 5% silt, non—plastic; 90% sand,coarse to fine, mostly med. sands; 5% gravel, med. to mostly fine, subang. to subrnd. gravels, mod. sorted; wet	< 0944	sw	-
-60	60.0-61.5	18-50/3"	0.5	0.0 ppm	SW — Silty gravelly SAND: It. br.; 5% silt, non—plastic; 75% sand, coarse to fine grained, mostly medium; 20% gravels, medium to mostly fine, subang, to submd. gravels, poorly sorted, poorly cemented, moist to wet	< 0952	sw	-
-65	65.0-66.5	15-17-18	0.9	0.0 ppm	ML — Sandy, clayey SILT; red brown; 90% silt, non—plastic to v. low plasticity; 5% clay; 5% sand, fine grained mica flakes present, moderatly sorted, wet to moist	< 1002	ML	-
NOTES								1
HUIES								

Docation	Pro	oject nam	€ Goodyear	Tire	& Rubbe	Co. Project No. 03761-005-00	Borin	g No. PB-16
Drilling Firm   Heber Mining Co.   Drilling Method   Hellow Stem Augar   O.D.   S.   Lev.   During Drilling   45.0'   0915/5-21-91   Start Date   S/27/91   After Drilling   After Drilling   S.   Lev.   Cosing Elev.   Start Date   S/27/91   Depth   Boring Depth   107.0 ft.   Depth   Measured Relative To   Grade   During Depth   Drilling   Depth Measured Relative To   Grade   Depth								
During Drilling   Method   Hollow Stem Auger   Hollow-Stem   Auger   O.D. 8"   L.O.3"   After Drilling   A								
Hollow-Stem Auger O.D. 8' I.D.3'   After Drilling   Start Date \$5/21/91							_	
Rotary Bit Dia_N/A   Casing Dia_N/A   Total Boring Depth   107.0 ft.   Depth Measured Relative To   Grade   Set   Casing Dia_N/A   Depth Measured Relative To   Grade   Set   Casing Bit   Casing Bit								
Total Boring   Depth   107.0 ft.   Depth   Measured Relative To   Grade   Logged By J. Moore								
SCALE   SAMPLE   SECT.   CONSTRUCTION							The second second	
N   DEPTH   SPT   BLOWS   REC.   PID or   OvuA(1)						Depth medatied Neighber 10 Grade	Logge	d by J. Moore
Ppm	IN	DEPTH	SPT BLOWS	REC.		MATERIAL DESCRIPTION TH	E LITH.	WELL CONSTRUCTION
ppm	-	70.0-71.5	11-13-12	1.1		black organic matter; 10% clay; 5% sand, med. to mostly fine grained, mod. sorted	)17 ML	-
-85 85.0-86.5 50/1" NR NA — No Recovery < 1050  -90 90.0-95.0 50/3" 0.2 0.0 ppm med. grained; 80% gravel, coarse to fine mostly fine, subang, to submd., poorly sorted, hard; wet    -95 95.0-96.5 50/3" NR NA — No Recovery	-75 -	75.0-76.5	22-50/6*	0.6		non-plastic; 75% sand, coarse to fine grained,   < 1 mostly med, sands; 20% arrayels, med, to	028 SW	-
90.0-95.0 50/3" 0.2 0.0 ppm	-80	80.0-81.5	10-12-16	0.3		-SAME as 75.0-76.5; 80% sand; 15% gravel; < 1.5% silt; moist to wet.	337 SW	
ppm   non-plastic; 10% sand, coarse to fine, mostly med. grained; 80% gravel, coarse to fine mostly fine, subang. to subrnd., poorly sorted, hard; wet   No Recovery   < 1200    100   100.0-	-85	85.0-86.5	50/1*	NR	NA -	No Recovery	)50	
100 100.0— 101.5 20—50/4* 0.7 0.0 ppm SM — Silty SAND: grayish br.; 10% silt, non~plastic; 90% sand, coarse to fine grained, mostly med. sands; bedding visible, mod. sorted; wet	-90	90.0-95.0	50/3"	0.2	0.0 ppm	med. grained; 80% gravel, coarse to fine, mostly med. grained; 80% gravel, coarse to fine mostly fine, subang, to subrnd., poorly sorted,	GW/ GM	
101.5 ppm ppm non-plastic; 90% sand, coarse to fine grained, mostly med. sands; bedding visible, mod. sorted; wet	-95	95.0-96.5	50/3"	NR	NA -		00	
NOTES:	100		20-50/4"	0.7		non-plastic; 90% sand, coarse to fine grained, mostly med, sands; bedding	10 SM	
NOTES:	HOTES							
	10159;							

Pro	oject nam	e Goodyear	Tire	& Rubbe	r Co	Project No. 03761-005-00		Boring No. PB-16
Lo	cation	Goodyear	, Arizo	na – Po	SA S	te		Sheet 4 of 4
Dri	illing Firm	Heber Mi	ning C	io		Water Levels: Depth Elevation Time	/Date	G.S. Elev
		od Hollow S				During Drilling45.0'0915/5	-21-91	Casing Elev
Но	llow-Stam	Auger O.D.	8"	I.D. <u>3"</u>		After Drilling		Start Date 5/21/91
		ia. <u>N/A</u> C						Finish Date5/21/91
Tot	tal Boring	Depth	107.0	ft.		Depth Measured Relative To		Logged By J. Moore
SCALE		SAMPLE						T T
FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)		MATERIAL DESCRIPTION	TIME	LITH. WELL SECT. CONSTRUCTION
	105.0-	18-50/3	0.5	0.0 ppm	silt mo	<ul> <li>Clayey sandy SILT: grayish~br.; 90%</li> <li>non~plastic; 10% sand, coarse to fine, stly med. grained, mica flakes visible, mod. red; mod.</li> <li>Sibs. SAND: grayish bas 100% sib.</li> </ul>	< 1240	ML/ SM
110					- gro	<ul> <li>Silty SAND: grayish—br.; 10% silt, non— stic, 90% sand, coarse to fine, mostly med. pined, poorly sorted, v. dense, hard; moist wet.</li> </ul>		
-					-	Bottom of boring @ 107.0 ft.		-
								-
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-	To Control			-				
-				+				
				t				-
NOTES	:							

Drill Drill Holl Rote	ation ling Firm ling Metho low—Stern ary Bit D	Goodyear  Heber Mi  od Hollow St  Auger O.D.  ia. N/A C	, Arizon ning Co tem Aug 8° asing I	er I.D.3 1/4		/Date 5-10-91	Boring No. PB-17/E-15 Sheet 1 of 4 G.S. Elev. Casing Elev. Start Date 5/09/91 Finish Date5/10/91 Logged By Barner
IN FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or DVA(1)	MATERIAL DESCRIPTION	TIME	LITH. WELL SECT. CONSTRUCTION
- 5 - 10 - 20 - 25 - 30					No samples collected from 0-40 ft. Cuttings predominantly gravels, silts and sands.		
NOTES:	-						

Depth   Dept	,	name Goodyear	Tire & Rubbe	r Co. Project No. 03761-005-00	Boring No 8-15
Drilling   Firm	Location	Goodyear	, Arizona - P	GA Site	
During Drilling Method   Hollow Stem Auger   During Drilling   51.0'   0.709/5-10-91   Start Date 3/09/9!   After Drilling   Start Date 3/09/9!   After Drilling   Start Date 3/09/9!   After Drilling   Start Date 3/09/9!   Start Date 3/09/9!   After Drilling   Start Date 3/09/9!	Drilling F	irm Heber Mi	ining Co.	Water Levels: Depth Elevation Time/	
Mollow-Stem Auger O.D. 8'   1.0, 3.1/4'   After Drilling   Start Date \$5/08/9: Finish Date					
Rotary Bit Dia					
Depth   SAMPLE   SA					
CALE   SAMPLE   SAMPLE   IN DEPTH   SPT BLOWS   REC.   PIO or OVA(1)   MATERIAL DESCRIPTION   TIME   LITH.   WELL   SECT.   CONSTRUCTION   SECT.   CONSTRUCTION   MIL   SECT.   CONSTRUCTION   MIL   SECT.					
No.   DEPTH   SPT   BLOWS   REC.   PID or   DOVA(1)   MATERIAL DESCRIPTION   TIME   SECT.   CONSTRUCTION    -40   40.0-41.5   60/0.5'   0.25   0.6   PPTM				STATE TO STATE	Logged by Barner
ppm silt; 30% gravel, fine to coarse and, to submat, 10% sand, fine to coarse grained, subang, to submat, 10% sand, fine to coarse grained, subang, to submat, 10% sand, fine to coarse grained, subang, to submat, med. to coarse grained, subang, to submat, med. well act, mineral constituents are quartx, feldsporse, ang. to supmat, some mineral composition as sands; 20% clay; maist.  SC/GC — As above, except 20% gravel; 15% clay and 5% silt; moist to wet.  SW — Gravelly SAND: It. br. to red.—br.; 70% sand, med. to coarse, subang, to submat, mod. well to well sorted; 30% gravel, variable colors, variable mineral composition, 0.25 to.  SW — Upper 1.0 ft. sandy GRAVEL: It. br. to red.—br.; 50% gravel; 50% sand; same characteristics as in \$5.0-60.0^{\circ}. CL — Lower 0.5 ft. silty CLAYS: br. to red.—br.; 50% gravel; 50% sand; low to med. plosticity.  SC — Gravelly, silty, clayey, SAND: red.—br.; 60% sand, mineral constituents are quartx, feldspars and ferromagnesium minerals, mod. well to well sorted; 30% clay; 10% silty and 10% gravel, up to 1 inch in diameter, ang.	IN DEPT	TH SPT BLOWS		MATERIAL DESCRIPTION	TIME LITH. WELL SECT. CONSTRUCTION
Subang. to submid.   SC/GC - Clayey gravelly SAND: It. br.; 50%, sond, med. to coarse grained, subang. to submid.   SC/GC - Clayey gravelly SAND: It. br.; 50%, sond, med. to coarse grained, subang. to submid. sore quartx, feldspars and ferromagnesium minerals; 30% gravel, ang. to submid. some mineral composition as sands; 20% clay; moist.   SC/GC - As above, except 20% gravel; 15% clay and 5% slit; moist to wet.   SC/GC - As above, except 20% gravel; 15% clay and 5% slit; moist to wet.   SW - Gravelly SAND: It. br. to redbr.; 70% sand, med. to coarse, subang. to submid. mod. well to well sorted; 30% gravel, variable mineral composition, 0.25 to.   O.5 inch diameter.   SW - Upper 1.0 ft. sandy GRAVEL: It. br. to redbr.; 30% gravel; 50% sand; some characteristics as in 55.0-60.0°.   CL - Lower 0.5 ft. slity CLAYS: br. to redbr.; 50% slit; 50% sand, low to med.   picaticity.   SC - Gravelly, slity, clayey, SAND: redbr.; 60% sand, med. to coarse grained, subang. to submid.   SC - Gravelly, slity, clayey, SAND: redbr.; feldspars and ferromagnesium minerals, mod.   New York of the well sorted; 30% clay; 10% slit; and 10% gravel, up to 1 inch in diameter, ang.   New York of the submidular continuents are quartx.   New York of the well sorted; 30% clay; 10% slit; and 10% gravel, up to 1 inch in diameter, ang.   New York of the well sorted; 30% clay; 10% slit; and 10% gravel, up to 1 inch in diameter, ang.   New York of the well sorted; 30% clay; 10% slit; and 10% gravel, up to 1 inch in diameter, ang.   New York of the well sorted; 30% clay; 10% slit; and 10% gravel, up to 1 inch in diameter, ang.   New York of the well sorted; 30% clay; 10% slit; and 10% gravel, up to 1 inch in diameter, ang.   New York of the well sorted; 30% clay; 10% slit; and 10% gravel, up to 1 inch in diameter, ang.   New York of the well sorted; 30% clay; 10% slit; and 10% gravel, up to 1 inch in diameter, ang.   New York of the well sorted; 30% clay; 10% slit; and 10% gravel.   New York of the well sorted; 30% clay; 10% slit; and 1	-40 40.0-	41.5 60/0.5		sit: 30% grave, fine to coorse and to	ML -
SW - Gravelly SAND: It. br. to redbr.; 70% sand, med. to coarse, subang. to subrnd., mod. well to well sorted; 30% gravel, variable colors, variable mineral composition, 0.25 to. 0.5 inch diameter.	-45 45.0-4	46.5 25-50/0.5°		Subang. to subrnd.  SC/GC - Clayey gravelly SAND: It. br.; 50%, sand, med. to coarse grained, subang, to subrnd., mod. well sorted, mineral constituents are quartz, feldspars and ferromagnesium minerals: 30% gravel and to subrnd some	
ppm 70% sand, med. to coarse, subang. to subrnd., mod. well to well sorted; 30% gravel, variable colors, variable mineral composition, 0.25 to. 0.5 inch diameter.  SW - Upper 1.0 ft. sandy GRAVEL: lt. br. to redbr.; 50% gravel; 50% sand; same characteristics as in 55.0-60.0'. CL Lower 0.5 ft. sitty CLAYS: br. to redbr.; 50% silt; 50% sand, low to med. plasticity.  SC - Gravelly, silty, clayey, SAND: redbr.; 60% sand, med. to coarse grained, subang. to subrnd., mineral constituents are quartz, feldspars and ferromagnesium minerals, mod. well to well sorted; 30% clay; 10% silt; and 10% gravel, up to 1 inch in diameter, ang. to subangular.	-50 50.0-5	1.5 40-35-26		SC/GC — As above, except 20% gravel; 15% clay and 5% silt; moist to wet.	
ppm redbr.; 50% gravel; 50% sand; same characteristics as in 55.0-60.0'.  Ct Lower 0.5 ft. sitty CLAYS: br. to redbr.; 50% sand, low to med. plasticity.  SC - Gravelly, silty, clayey, SAND: redbr.; 60% sand, med. to coarse grained, subang. to subrnd., mineral constituents are quartz, feldspars and ferromagnesium minerals, mod. well to well sorted; 30% clay; 10% silt; and 10% gravel, up to 1 inch in diameter, ang. to subangular.	-55   55.0-5	6.5 12-10-4		70% sand, med. to coarse, subang. to subrnd., mod. well to well sorted; 30% gravel, variable colors, variable mineral composition, 0.25 to.	sw
ppm 60% sand, med. to coarse grained, subang, to subrnd., mineral constituents are quartz, feldspars and ferromagnesium minerals, mod. well to well sorted; 30% clay; 10% silt; and 10% gravel, up to 1 inch in diameter, ang. to subangular.	-60 60.0-6	1.5 21-14-10		redbr.; 50% gravel; 50% sand; same characteristics as in 55.0-60.0'.  CL Lower 0.5 ft. silty CLAYS: br. to redbr.; 50% silt; 50% sand, low to med.	-
	65.0-6	6.5 10-14-30		60% sand, med. to coarse grained, subang. to subrnd., mineral constituents are quartz, feldspars and ferromagnesium minerals, mod. well to well sorted; 30% clay; 10% silt; and 10% gravel, up to 1 inch in diameter, ang.	sc -
OTES:	70				
	NOTES:				

SAMPLE   SAMPLE   SAMPLE   SAMPLE   SAMPLE   SECTION   TIME   LTTH.   WELL   SECTION   SECTION	Drilling Firm   Heber Mining Co.   Drilling Method   Hollow Stem Augar O.D.   SI.D.   Drilling   S1.0'   O700/5-10-91	Project	nameGoodyea	r Tire & Rubb	er Co. Project No. 03761-005-00	Boring No. E-15
Drilling   Method   Hollow Stem Auger   Drilling   Drilling   Method   Hollow Stem Auger   Drilling   Drilli	Drilling   Firm   Heber Mining Co.   Drilling   Method   Hollow Stem Auger   During Drilling   S1.0"   O700/5-10-91   After Drilling   S1.0"   O700/5-10-91   O700/5	Location	Goodyear	r, Arizona – F	PGA Site	Sheet_3_of_4_
During Origing   Sale   During   Sale   Origing   Original   Origing   Original   Origing   Original	During Origing   Sand   Sand	Drilling F	irmHeber_M	ining Co.	Water Levels: Depth Elevation Time/Date	
Hollow-Stem Auger 0.0_g*   L0_3_1/4   After Drilling   Rotary Bit Dia_N/A_ Casing Dia_N/A   Drotal Boring Depth   107.0 ft.   Depth   Drotal Boring Depth   107.0 ft.   Depth   Drotal Boring Depth	Hollow-Stem Auger 0.08"   1.03 1/4"   After Drilling   Rotary Bit DiaN/A_ Casing DiaN/A   Depth   107.0_ft.   Depth   SFE BLOWS   REC.   Plb or FEET   RANGE   per 6 in.   OWA(1)   Depth   SFE BLOWS   REC.   Plb or submid.   Depth   SFE BLOWS	Drilling N	dethod Hollow S	tem Auger		
Rotary Bit DiaN/A_ Casing DiaN/A_   Depth   107.0 ft.   Depth   Measured Relative To _Grade   Casing DiaN/A_   Depth	Rotary Bit Dia	Hollow-S	item Auger O.D	. 5° 1.D. 3		
Total Boring Depth   107.0 ft.   Depth Measured Relative To Grade   Logged By Barner	Total Boring Depth   107.0 ft.   Depth Measured Relative To Grade   Logged By Barner					
N   DEPTH   PANGE   Part 6   No.	N   DEPTH   SPINGE   Pace   6 in   OVA(1)					Logged By Barner
SAMSE   Per 6 in.   DWA(1)   TO.0-71.5   R-21-30   1.0   D.0   D	SAMSE   Per 6 in.   Pow   Per 6 in.   Pow   Per 6 in.   Per 6 in	SCALE			MATERIA) DESCRIPTION	Lorent Lorent
Spm	Spring   S	FEET RAN	GE per 6 in.		IME	SECT. CONSTRUCTION
Down	Down	70.0-	71.5 8-21-30		F sand, fine grained, well sorted subana to	SM .
ppm red.—pr; 50% sand, fine to coarse grained, subang, to subrnd. 30% silt; 10% gravels, ang. to subrnd. 30% silt; 10% gravels, ang. 10% clay. 10% clay. 30% silt; 20% gravel up to 0.5 inches in diameter; 10% clay; 30% silt; 20% gravel up to 0.5 inches in diameter, ang. to subrnd. Bottom 2 inches is a lt. br. caliche layer.  -90 90.0—91.5 10—22—43 1.0 0.0 ppm - CL/GC — As above (see 85.0—90.0).  -100 100.0—101.5 10—19—19 1.5 0.0 ppm - CL — Sandy, silty, CLAY: brick red to red.—br.; 40% silt; 10% very fine sand, firm and moist.  -100 100.0—101.5 10—19—19 1.5 0.0 ppm - SP — Upper 0.8 ft. sand: red.—br.; 100% sand, coarse grained, well sorted, subang, to subrnd.  -100 100.0—101.5 10—19—19 1.5 0.0 ppm - SP — Upper 0.8 ft. sand: red.—br.; 100% sand, coarse grained, well sorted, subang, to subrnd.  -100 100.0—101.5 10—19—19 1.5 0.0 ppm - SP — Upper 0.8 ft. sand: red.—br.; 100% clay: 40% silt; plostic.	ppm red.—pr; 50% sand, fine to coarse grained, subang, to subrnd; 30% silt; 10% gravels, ang, to subrnd. 30% silt; 10% gravels, ang, 10% clay; 30% silt; 20% gravel up to 0.75 inches in diameter; and to subrnd. Bottom 2 inches in diameter, ang, to subrnd. Bottom 2 inches in diameter, ang, to subrnd. Bottom 2 inches is a lt. br. caliche layer.  -90 90.0—91.5 10—22—43 1.0 0.0 ppm - CL/GC — As above (see 85.0—90.0).  -01 00.0—101.5 10—19—19 1.5 0.0 ppm - CL/GC — As above (see 85.0—90.0).  -02 - CL/GC — As above (see 85.0—90.0).  -03 - CL/GC — As above (see 85.0—90.0).  -04 - CL — Sandy, silty, CLAY: brick red to red.—br.; 40% silt; 10% very fine sand, firm and moist.  -05 - CL — Sandy, silty, CLAY: brick red to red.—br.; 40% silt; 10% very fine sand, firm and moist.  -06 - CL — Sandy, silty, Clay: brick red to red.—br.; 40% silt; 10% very fine sand, firm and moist.  -07 - CL — Sandy, silty, Clay: brick red to red.—br.; 40% silt; 10% very fine sand, firm and moist.  -08 - CL — Sandy, silty, Clay: brick red to red.—br.; 40% silt; 10% very fine sand, firm and moist.  -09 - CL/GC — As above (see 85.0—90.0).	-75 75.0-	76.5 15-25-18		60% sand, fine to coarse grained, mod. well well sorted: 20% arayel, and to subrad: 10%	sw -
ppm   clay; 30% silt; 20% gravel up to 0.5 inches in diameter, ang. to subrnd. Bottom 2 inches is a lt. br. caliche layer.   CL/GC   As above (see 85.0-90.0).   CL/GC   Ppm   CL   Sandy, silty, CLAY: brick red to redbr.; 40% silt; 10% very fine sand, firm and moist.   CL   Ppm   CL   Sandy, silty, CLAY: brick red to redbr.; 40% silt; 10% very fine sand, firm and moist.   CL   Ppm   SP   Upper 0.8 ft. sand: redbr.; 100% sand, coarse grained, well sorted, subang. to subrnd.   CL   Solventon 0.7 ft. silty clay: it. redbr.; 60% clay; 40% silt; plastic.   CL   CL   CL   CL   CL   CL   CL   C	ppm clay; 30% silt; 20% gravel up to 0.5 inches in diameter, ang. to subrnd. Bottom 2 inches is a lt. br. caliche layer.		81.5 12-18-22		redbr.; 50% sand, fine to coarse grained, subang. to subrnd.; 30% silt; 10% gravels, ang. to subrnd. up to 0.75 inches in diameter;	SM -
95.0-96.5  1.0  CL - Sandy, silty, CLAY: brick red to redbr.; 40% silt; 10% very fine sand, firm and moist.	95.0-96.5  1.0  CL - Sandy, silty, CLAY: brick red to redbr.; 40% silt; 10% very fine sand, firm and moist.  CL - Sandy, silty, CLAY: brick red to redbr.; CL - Sandy silt; 10% very fine sand, firm and moist.  SP - Upper 0.8 ft. sand: redbr.; 100% sand, coarse grained, well sorted, subang. to subrad. CL - Bottom 0.7 ft. silty clay: it. redbr.; 60% clay; 40% silt; plastic.	- 85   85.0-	86.5 27-55/.5		clay; 30% silt; 20% gravel up to 0.5 inches in diameter, and, to subrad. Bottom 2 inches is	CL/ GC
100 100.0- 10-19-19 1.5 0.0 ppm SP - Upper 0.8 ft. sand: redbr.; 100% sand, coarse grained, well sorted, subang. to subrnd. CL - Bottom 0.7 ft. silty clay: it. redbr.; 60% clay; 40% silt; plastic.	100 100.0- 10-19-19 1.5 0.0 ppm SP - Upper 0.8 ft. sand: redbr.; 100% sand, coarse grained, well sorted, subang. to subrnd. CL - Bottom 0.7 ft. silty clay: it. redbr.; 60% clay; 40% silt; plastic.	90.0-	91.5 10-22-43			CL/
ppm sand, coarse grained, well sorted, subang. to subrnd. CL — Bottom 0.7 ft. silty clay: it. red.—br.; 60% clay; 40% silt; plastic.	ppm sand, coarse grained, well sorted, subang. to subrnd. CL — Bottom 0.7 ft. silty clay: it. red.—br.; 60% clay; 40% silt; plastic.	-95 95.0-	96.5	1.0	CL — Sandy, silty, CLAY: brick red to red.—br.; 40% silt; 10% very fine sand, firm and moist.	CL
					sand, coarse grained, well sorted, subang. to subrnd. CL - Bottom 0.7 ft. silty clay: it. redbr:	
		105			-	
WHITE TO	NOTES:					

		@ Goodyear Goodyear			o. Proj	ect No	03761-005-	00		No. PB-17/5
					Water Levels:	Depth	Elevation Ti	me/Date		4 of 4
					During Drilling				Casino	Elev.
Hol	llow-Stem	Auger O.D.	- 5°	I.D. <u>3 1/4</u>	After Drilling					Date 5/09/91
					Well Level					Date5/13/91
Tot	al Boring	Depth	107.0	ft.	Depth Measure	d Relativ	e To Grade			d By Barner
SCALE		SAMPLE								T
FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIA	AL DESCRIP	PTION	TIME	LITH. SECT.	WELL CONSTRUCTION
-	105.0- 105.6	9-22-19	1.5	S	ample as above (	see 100.0	-105.0).			_
				- 6	ottom of boring (	<b>a</b> 107.0°.				
-				+						
-110				-						_
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-115										
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-120				-						-
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				T						-
										+
-125										
				-						
				-						
				-						1
				+						4
-130				-						4
				-						-
										-
										-
135										1
				1						
				-						
140				+						-
140 NOTES:	:							1		
									-	

Lo Dri Dri Ho Ro	cation_ illing Firm illing Metho ollow—Stem otary Bit D tal Boring	Goodyear  Goodyear  Heber Mi  od Hollow S  Auger O.D  id. N/A C  Depth  SAMPLE  SPT BLOWS per 6 in.	r, Arizer ining ( tem A . a" Casing	ona - Poolo -	Water Levels:   Depth   Elevation   Time	/Date	Sheet G.S. E Casing Start Finish Logged	NoPB-18  1 of 4  Dev Date 5/17/9: Date 5/17/9: By J. Macre
- 5 - 5 - 10 - 15	10.0-11.5	9-12-17	1.5	0.2 ppm	ML — Sandy gravelly SILT: dull red.—br.; 85% silt, soft to firm, brittle, non-plastic; 5% sand, coarse to fine grained; 10% gravel, med. to mostly fine, rounded to subrnd.; mod. sorted, dry.	< 0630	ML	
-20	20.0-21.5	12-22-28	0.7	0.0 ppm	- SM/SW Gravelly silty SAND: It. br.; 15% silt, firm, brittle, non-plastic; 80% sand, med. to mostly fine grained, with trace amt. of coarse; 5% gravel, subrnd., to rnd., med. to fine gravels, dry.	< 0639	SM/ SW	-
-25	25.0-26.5	14-50/3"	0.8	0.0 ppm	ML/GW — Sandy SILT: red.—br.; 90% silt, brittle, firm, non—plastic; 10% sand, med. to mostly fine sands, mod. sorted, dry. Sandy GRAVELS: gray; 30% sand, coarse to fine grained; 70% gravel, ang. to subang., mod. sorted, dry (coarse to fine gravels).	< 0704	ML/ GW	
	30.0-31.5	22-18-20	0.6	0.0 ppm	SW — Gravelly SAND: grayish—white; 75% sand, coarse to fine grained sands, mostly med.; 25% gravels, subang, to subrnd., coarse to fine gravels, like streambed deposits, poorly sorted, dry.	< 0714	sw	-
35 NOTES:								
10123	20.0' -	21.5': Very	y thin	bedding	plains visible.			

Pr	oject name	a Goodyear	Tire	& Rubber	Co. Project No. 03761-005-00	Boring No. PB-18
1		Goodyear				Sheet 2 of 4
Dr	illing Firm_	Heber Mi	ning C	io.	Water Levels: Depth Elevation Time/Date	
		d Hollow S				
Но	llow-Stem	Auger O.D.	. 8"	_1.03	After Drilling	Start Date 5/17/9
Ro	tary Bit Di	ia. N/A C	asing	Dia N		Finish Date5/17/9
To	tal Boring	Depth	107.0	ft.	Depth Measured Relative To Grade	
SCALE		SAMPLE				Edged by b. Moore
IN FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION TIME	LITH. WELL SECT. CONSTRUCTION
-	35.0-36.5	18-50/6	0.9	0.0 ppm	GM — Sandy silty GRAVEL: br.; 25% silt, firm, non-plastic; 15% sand, coarse to fine grained, mostly med. sands; 60% gravels, coarse to fine grained subang. to subrnd. dry to maist.	14 GM
- 40 	40.0-41.5	50/5*	0.3	0.0 ppm	GM — Same as above (see 35.0'-36.5'); with 15% silt; 10% sand; 75% gravels, v. ang. to subang., dry to moist.	27 GM -
- 45 - -	45.0-46.5	20-22-26	1.5	0.6 ppm	SW — Gravelly SANDS: grayish—white; 75% sands, coarse to fine grained, mostly coarse sands; 25% gravels, coarse to fine, ang. to subang., poorly sorted, wet.	6 sw _
- 50 - 50	50.0-51.5	8-13-10	1.5	0.0 ppm	ML — Sandy clayey SILT: red.—br.; 90% siit, firm, non—plastic to v. low plasticity; 5% clay; 5% sand, med. to mostly fine sands, mod. to well sorting, moist.	0 ML
-55 -55	55.0-56.5	5-7-6	1.3	0.4 ppm	ML — Clayey sandy SILT: red.—br.; 85% silt, firm, non-plastic to low plasticity; 5% clay; 10% sand, med. to mostly fine grained sands with mica flakes, mod. sorted, moist.	B ML _
-60	60.0-61.5	8-10-14	0.9	0.0 ppm	ML/SW — Sandy clayey SILT: red.—br.; 80% silt, < 081: firm, non-plastic to low plasticity; 5% clay; 15% sands, med. to fine grained; grading to: silty gravelly SAND: br.; 5% silt; 85% sand, coarse to fine grained, mostly med.; 10% gravels, with med. to fine subang. to subrnd.,	5 ML/ SW -
-65	65.0-66.5	9-9-5	NR	NA -	poorly sorted, wet.  No recovery (NR)  NA — Not Available	,
				+		
70					ween 38.0 to 43.0 ft.	

SECT   CONST   Per 8 in.   OVA(1)   SW - sand: br.; 100% sand, coarse to fine, dominantly med. sands, well sorted, subang. to rounded, wet.   SW - same as above (see 70.0'-71.5'), wet.   < 0909   SW	Dr	lling Metho	Auger O.D.	tem Au	l.D3"	After Drilling	-17-91	Casing Start	Date <u>5/17/9</u>
No.   DEPTH   SPT BLOWS   Per 6 in.   OVA(1)									
Description   Description	IN	DEPTH RANGE	SPT BLOWS per 6 in.			MATERIAL DESCRIPTION	TIME	UTH. SECT.	WELL CONSTRUCTION
SW - Gravelly SAND; brgray; 85% sand, coarse to fine grained, mostly med. sands; 15% gravels, coarse to fine gravels, submd. to rnd., poorly sorted, wet.   SW - Same as above; 90% sand; 10% gravel grading to: ML - Sandy clayey SILT: br.; 85% slit, non- plastic to low plasticity, hard; 10% clay; 5% sand, fine grained, mica flakes present, moist.   SW - Same as above; 90% slit; 5% clay; 5% sand, fine grained in the sandy clayey slit; 5% clay; 5% sand grading to: SM - Clayey slity SAND; brgrayel sand; 10% gravel grading to: ML - Same as above; 90% slit; 5% clay; 5% sand grading to: SM - Clayey slity SAND; brgrayel sand; more plasticity, firm to hard; 5% clay; 75% sond, med. to mostly fine sands, moist.   SM - Same as above; 90% slit; 5% clay; 5% sand, med. to fine grained sands, mica flakes present, moist.   SM - Same as above; 90% slit; 5% clay; 5% sand, med. to fine grained sands, mica flakes present, moist.   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - Same as above; 90% slit; 5% clay: 0958 ML   SM - SAME above; 90% slit; 5% clay: 0958 ML   SM - SAME above; 90% slit; 5% clay: 0958 ML   SM - SAME above; 90% slit; 5% clay: 0958 ML   SM - SAME above; 90% slit; 5% clay: 0958 ML		70.0-71.5	5-7-9	0.5	ppm -	dominantly med. sands, well sorted, subang. to	< 0838	3 SW	
ppm coarse to fine grained, mostly med. sands; 15% gravels, coarse to fine grained, mostly med. sands; 15% gravels, coarse to fine gravels, submd. to rnd., poorly sorted, wet.  SW — Same as above; 90% sand; 10% gravel grading to: ML — Sandy clayey SILT: br.; 85% silt, non—plastic to low plasticity, hard; 10% clay; 5% sand, fine grained, mica flakes present, moist.  90 90.0—91.5 14—22—25 0.9 0.0 ppm — ML — Same as above; 90% silt; 5% clay; 5% sand, med. to mostly fire sands, moist.  ML — Sandy clayey SILT: br.; 80% silt, non—plasticity, firm to hard; 5% clay; 75% sand, med. to mostly fine sands, moist.  ML — Sandy clayey SILT: br.; 80% silt, non—plasticity firm to hard; 15% clay; 5% sand, med. to fine grained sands, mica flakes present, moist.	-75	75.0-76.5	8-7-9	0.7	0.5 ppm	SW — same as above (see 70.0'71.5'), wet.	< 0909	SW	
90 90.0-91.5 14-22-25 0.9 0.0 ppm	80	80.0-81.5	9-9-16	1.0	ppm	coarse to fine grained, mostly med. sands; 15% gravels, coarse to fine gravels, subrnd. to		SW	
sand grading to: SM — Clayey sitty SAND; br.; 20% silt, non—plastic to low plasticity, firm to hard; 5% clay; 75% sand, med. to mostly fine sands, moist.  95. 95.0-96.5 15-24-16 1.1 0.0 — ML — Sandy clayey SILT: br.; 80% silt, non—plasticity to low plasticity, firm to hard; 15% clay; 5% sand, med. to fine grained sands, mica flakes present, moist.  96. 97.0-96.5 15-24-16 1.1 0.0 — ML — Same as above; 90% silt; 5% clay; < 1015 ML	85	85,0-86.5	22-20-12	0.7	ppm	grading to: ML — Sandy clayey SILT: br.; 85% silt, non— plastic to low plasticity, hard; 10% clay; 5% sand, fine grained, mica flakes	< 0939		
ppm plasticity to low plasticity, firm to hard; 15% clay; 5% sand, med. to fine grained sands, mica flakes present, moist.  OU 100.0- 15-22-24 1.5 0.0 ML - Same as above; 90% silt; 5% clay; < 1015 ML	90	90.0-91.5	14-22-25	0.9	ppm	sand grading to: SM — Clayey silty SAND; br.; 20% silt, non-plastic to low plasticity, firm ta hard; 5% clay; 75% sand, med. to	< 0945		
	95	95.0 <del>-9</del> 6, <b>5</b>	15-24-16	17	ppm	plasticity to low plasticity, firm to hard; 15%	< 0958	ML	
ppm 5% sana, moist.	00	100.0- 101.5	15-22-24	1.5	0.0 ppm	ML — Same as above; 90% silt; 5% clay; 5% sand, moist.	< 1015	ML	

Pro	oject nam	e Goodyear	Tire	& Rubbe	r Co.	Project No. 03761-005-00		Boring	No. PB-18
		Goodyear							4 of 4
Dri	lling Firm	Heber M	ning C	o.		Water Levels: Depth Elevation Time	/Date		Elev
Dri	lling Meth	od Hollow S	tem A	uger		During Drilling 45.5' 0736/	5-17-91	Casina	g Elev
Ho	llow-Stem	Auger O.D	. 8"	_l.D;	3"	After Drilling			Date <u>5/17/9</u> 1
Ro	tary Bit D	ia. N/A C	asing	Dia. N	/A	Well Level			Date 5/17/91
1		Depth			- 1	Depth Measured Relative To Grade			
						Grade		rogga	d By J. Moore
SCALE IN FEET	DEPTH RANGE	SAMPLE SPT BLOWS per 6 in.	REC.	PID or OVA(1)		MATERIAL DESCRIPTION	ТІМЕ	LITH. SECT.	WELL CONSTRUCTION
-	105.0- 106.5	10-13-21	0.9	0.0 ppm	SW nor	<ul> <li>Sitty SAND: grayish-br.; 5% silt,</li> <li>plastic; 95% sand, med. to fine grained</li> <li>mostly med. grained, wet.</li> </ul>	< 103	1 SW	-
					3	Bottom of boring @ 107.0 ft.		1	
-									
-110									
-					_		İ		_
-					_				
-									
- 1				1					
115				1	_				_
- 1									_
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120				t					-
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125									
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- 1				L					
- 1				1	9				
130				1	_				
-				-					
-				1					
-				-					
-				1					
135				-	_				
-				-					
				+					
-				+					
				+					1
NOTES:									
.10163.									

Depth   Sect   Depth   Sect   Depth	Pr	oject name	eGoodyea	r Tire	& Rubbe	r Co. Project No. 03761-005-00		Boring	No. PB-19
Drilling Firm Heber Mining Co.  Drilling Method Hollow Stem Auger Hollow-Stem Auger O.D8"   1.D3"   After Drilling   Not Avoilable   Start Date 5/20/5   Start D									
During Drilling   Not Available   Casing Elev.	Dr	illing Firm	Heber M	ining C	io.	Water Levels: Depth Elevation Time	/Date		
Hollow-Stern Auger O.D. 8"   I.D. 3"   After Drilling   Start Date 5/20/3   Rotary Bit Dia. N/A   Casing Dia. N/A   Total Boring Depth 43.0 ft. / 47.0 ft.   Depth Measured Relative To Grade   Logged By J. Moor   Logged By J.									
Rotary Bit DiaN/A   Casing DiaN/A   Total Boring Depth_43.0 ft. / 47.0 ft.   Depth Measured Relative To Grade   Logged ByJ_Moor	Ho	llow-Stem	Auger O.D	. 8"	_1.D;				
Total Boring Depth	Ro	tary Bit Di	iaN/A_ (	Casing	Dia. N				
NATERIAL DESCRIPTION   TIME   LTH.   WELL	To	tal Boring	Depth 43.	0 ft.	47.0 ft	Depth Measured Relative To Grade			117711111111111111111111111111111111111
FEET RANGE per 6 in. OVA(1)						TATEOUS AGREEMENT		1	1
-10 10.0-11.5 22-50/5" 0.8 0.0 ppm	FEET			REC.		MATERIAL DESCRIPTION	TIME	SECT.	CONSTRUCTION
-15 -20 20.0-21.5 8-10-16 0.9 0.0 ppm -SW - Gravelly SAND: grayish-br.; 95% sand, coarse to mostly fine grained; 5% gravels, med. to dominantly fine grayels, rounded, to		10.0-11.5	22-50/5	0.8		mostly fine grained: 5% gravels, coarse to fine		ML	
ppm coarse to mostly fine grained; 5% gravels, med. to dominantly fine gravels, rounded, to									
	-20	20.0-21.5	8-10-16	0.9		coarse to mostly fine grained; 5% gravels, med. to dominantly fine gravels, rounded, to	< 1220	SW	
-25   25.0-26.5   50/3"   0.1   0.0 ppm   SW - Same as above: with 80% sands, 20%   < 1230   SW - Swards   Swar	-25	25.0-26.5	50/3"	0.1		- SW - Same as above: with 80% sands, 20% gravels; dry.	< 1230	SW	-
SW - Gravelly SAND: br.; 85% sand, coarse to fine, mostly med. grained; 15% gravels, subang. to subrnd., coarse to mostly fine gravels, poorly sorted, dry.		30.0-31.5	28-50/4"	0.3	0.0 ppm	fine, mostly med. grained; 15% gravels, subang. to subrnd., coarse to mostly fine gravels,	< 1300	sw	
NOTES: * Gravel zone from 23.0 ft. to 33.0 ft. below grade.									

Pr	oject name	e <u>Goodyear</u>	Tire	& Rubber	Co. Project No. 03761-005-00		Boring	No. P8-19
1		Goodyear						2 of 2
Dri	illing Firm_	Heber M	ining C	o.	Water Levels: Depth Elevation Time	/Date		lev
Dri	illing Metho	d Hollow S	tem Au	iger				Elev.
		Auger O.D						Date 5/20/9:
		aN/A_C						Date5/21/9
1		Depth_ 43.						
SCALE		SAMPLE			31000		Logger	d By J. Moore
!N	DEPTH	SPT BLOWS	REC.		MATERIAL DESCRIPTION	TIME	LITH.	WELL
FEET	RANGE 35.0-36.5	per 6 in. 50/5	0.2	0.0 0.0	GW - Silty sandy GRAVELS, gray-white; 10%	- 1775		CONSTRUCTION
-				ppm	silt, non-plastic; 10% sand, coarse to fine, mostly fine sand; 80% gravels, coarse to mostly fine, subang, to subrad, dry.	< 1335	GW	10 - 0 10 - 0 10 - 0
-								9.
-40	40.0-41.5	31-50/3"	0.5	0.0 ppm	GM — Silty GRAVEL: red.—br.; 40% silt, non— plastic to low plasticity; 5% clay; 5% sand.	< 1340	GM	-
					coarse to fine grained; 50% gravels, coarse to fine ang. to subrnd., poorly sorted, moist.			6.
					, porty dorted, moid.			-
				L				
-45	45.0-46.5	50/5"	0.2	0.6	GW - Sifty sandy GRAVELS: redbr.; 5% sift;	5-21-9	1 GW	
		67.0		ppm	5% sand, coarse to fine grained, mostly med. sands; 90% gravels, coarse to fine gravels,	< 0635	GW	
				-	mostly fine subang, to subrnd, dry to moist.			
-				+	Auger refusal @ 43.0 ft, and 47.0 ft.			
-				+				
-50				1	· .			_
				ŀ				
				t				
								-
-55								-
- 30					** Drilling observed heavy concentrations of gravel between 23.0 ft. and 47.0 ft. Borehole was offset once when auger refusal was observed <b>a</b> 43.0 ft. and then at 47.0 ft.			-
-60								-
00								
				1				
				-				
-65				1				
				1				
				+				
				+				
70				+				
70	No. 1		-1-1-1		f auger refusal.			

No.   DEPTH   SPT BLOWS   REC.   PID or   OVA(1)	Dri Dri Ho Ro	cation_ illing Firm, illing Metho illow—Stem tary Bit D tal Boring	Goodyear  Goodyear  Heber Mi  od Hollow St  Auger O.D.  ia. N/A C  Depth 102	ning C tem A . 8"	ona - PGA Co. uger I.D. 3"	Water Levels:         Depth         Elevation         Time           During Drilling         55.0         0710/5           After Drilling	/Date -20-91	Sheet_ G.S. E Casing Start Finish	NoPB-20 1 of 3 NoPB
-10 10.0-11.5 5-5-7 1.3 0.0 ppm		DEPTH	SPT BLOWS	REC.		MATERIAL DESCRIPTION	TIME	LITH. SECT.	WELL CONSTRUCTION
ppm plastic; 65% sand, coarse to fine grained, mostly fine sonds; 25% gravels, med. to mostly fine, subrnd. to subang., poorly sorted, dry.  GM — Sandy silty GRAVELS: grayish—white; 30% silt, brittle, non—plastic; 20% sand, coarse to fine—grained, mostly med.; 50% gravels, coarse to fine, subang. to ang., poorly sorted, dry.  30 30.0—31.5 52/5" 0.4 0.2 ppm SW/GW — GRAVEL AND SAND: br.; 50% sand, coarse to fine, mostly fine grained; 50% gravel, coarse to mostly fine gravels, subang. to rounded, poorly sorted, dry to moist.	-10 -15	10.0-11.5		1.3	0.0 ppm	brittle, soft to firm; 5% sand, fine grained.	< 1310		
silt, brittle, non-plastic; 20% sand, coarse to fine-grained, mostly med.; 50% gravels, coarse to fine, subang. to ang., poorly sorted, dry.  30 30.0-31.5 52/5"  0.4 0.2 ppm	-20	20.0-21.5	20-24-50	1.0	- 1	plastic; 63% sand, coarse to fine grained, mostly fine sands; 25% aravels, med, to mostly	< 1320	SW	-
ppm coarse to fine, mostly fine grained; 50% gravel, < 0604 SW coarse to mostly fine gravels, subang, to rounded, poorly sorted, dry to moist.	-25	25.0-26.5	20-50/4"	0.7	ppm   s	sit, brittle, non-plastic; 20% sand, coarse to fine-grained, mostly med.; 50% grayels, coarse	< 1330	GM	-
	-30	30.0-31.5	52/5"	0.4	ppm   c	coarse to fine, mostly fine grained; 50% gravel, coarse to mostly fine gravels, subana, to	5/20/91 < 0604	GW/ SW	-
	35				-				-
Of French	OTES	:							

Project name Goodyear Tire & Rubber Co. Project No. 03761-005-00  Boring No. PB-20  Location Goodyear, Arizona - PGA Site  Drilling Firm Heber Mining Co. Water Levels: Depth Elevation Time/Date G.S. Elev.
Davis - F
Urilling Firm Heber Mining Co.   Water Levels: Depth Flavation Time / Data   C.S. Flav
Dellin Alabad and
Hellew Stews Avers O.C. St. 10. or 10.
Peters Pit Die 11/4 Control Die 11/4 Con
1111011 0410-7-4-7-
Total Boring Depth 102.0 ft. Depth Measured Relative To Grade Logged By J. Moore
CALE SAMPLE IN DEPTH SPT BLOWS REC. PID or MATERIAL DESCRIPTION TIME LITH. WELL
EET RANGE per 6 in. OVA(1) SECT. CONSTRUCTION
35.0-36.5 26-50/5" 0.3 0.2 ppm SW - Silty gravelly SAND: br.; 5% silt, non- < 0619 SW plastic; 50% sand, coarse to fine mostly coarse grained; 45% gravels, coarse to fine gravels, ang. to subrnd., poorly sorted, maist to dry.
40.0-41.5 14-18-21 1.3 0.4 ppm GW - Silty sandy GRAVEL: redbr.; 5% silt, 35% sand, coarse to fine grained, mostly fine; 60% gravels, coarse to fine, mostly fine subang. to subrnd., streambed deposits, poorly sorted, moist.
45 45.0-46.5 21-28-32 1.1 0.6 ppm SW - Gravelly SANDS: grayish-br.; 2% silt; 83% < 0645 SW - sand, coarse to fine grained, mostly med. sands; 15% gravels, med. to fine, rnd. to
subrnd., poorly sorted, moist.  50 50.0-51.5 10-9-7 1.4 0.0 ppm   ML - Sandy clayey SILT: redbr.; 85% silt, soft to firm, non-plastic to v. low plasticity; 10% clay; 5% sand, fine grained with small thin lenses of pure silt, mod. to well sorted, moist.
55 55.0-56.5 16-21-21 0.6 O.0 ppm SW - Silty gravelly SAND: redbr.; 5% silt, non-plastic; 90% sand, coarse to fine grained, mostly med. sands; 5% gravels, med. to fine, subang, to subrnd., poorly sorted, moist to wet
60 60.0-61.5 6-7-7 0.9 0.2 ppm    ML - Sandy clayey SILT: redbr.; 85% silt, soft< 0722 ppm    soft to firm, non-plastic to low plasticity; 5% sand, fine grained, micaceous; 10% clay, mod. to well sorted, some sections are dry and brittle, moist to wet.
65 65.0-66.5 7-13-15 0.2 0.0 Ppm Plastic to v. low plasticity; 10% sand, med. to dominantly fine grained, mica flakes present, mod. sorted, moist.
70 OTES: * Wet @ approximately 55.0 ft.

Pro	oject name	Coodyear	Tire	& Rubbe	Co. Project No. 03761-005-00	Boring No. PB-20
Lo	cation	Goodyear	, Arizo	ng - Po	SA Site	Sheet 3 of 3
Dri	lling Firm	Heber Mi	ning C	о.	Water Levels: Depth Elevation Time/Date	
Dri	lling Metho	od Hollow St	tem Au	ıger	The state of the s	
Но	llow-Stem	Auger O.D.	8	_I.D;		Start Date 5/17/91
Ro	tary Bit Di	ia. <u>N/A</u> C	asing	Dia. N		Finish Date5/20/91
Tot	al Boring	Depth	102.0	ft.	Depth Measured Relative To Grade	Logged By J. Moore
SCALE		SAMPLE				
IN FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION TIME	LITH, WELL SECT. CONSTRUCTION
	THE RESERVE AND ADDRESS OF THE PARTY OF THE	9-12-16	0.4	0.0	Same as above (see 65.0-70.0); moist. < 07-	
- - - -75	75.0-76.5	11-19-21	0.3	0.0 ppm	ML — Clayey sandy SILT; red—br.; 90% SILT, non—plastic to v. low plasticity: 5% clay: 5%	
- 80	80.0-81.5	5-6-4	0.2	O.O ppm	sand, fine grained, mod. to well sorted; moist to wet.  Same as above (see 75:0 - 80.0); moist to < 081	O ML -
- - 85 -	85.0-86.5	8-9-50/1*	0.3	0.0 ppm	ML — Gravelly SILT: red.—br.; 80% silt, non— < 082 plastic to low plasticity; 5% clay; 5% sand, coarse to fine grained; 10% gravel, ang. to submd., poorly sorted; moist.	5 ML -
-90	90.0-91.5	11-14- 50/4"	0.3	0.0 ppm	-ML - Sandy SiLT: br.; 90% silt, non-plastic to v. low plasticity; 5% clay; 5% sand, fine grained, poorly graded, mod. sorted; moist to wet.	9 ML
95	95.0-96.5	12-14- 50/4"	0.4	0.0 ppm	-ML/SW - Sandy SILT: br.;55% silt, firm to hard < 090 non-plastic to low plasticity; 45% sand, coarse to fine grained. Grading to: silty gravelly SAND: 5% silt; non-plastic; 75% sand, coarse to fine grained; 20% gravel, subrnd. to subang, coarse to fine, poorly sorted; wet.	0 ML/ SW +
100	100.0-	50/3"	0.2	0.0 ppm	-SM - Silty SAND: br.; 5% silt, non-plastic; 95% sand, coarse to fine grained, mostly med. sands, mod. to well sorted; wet.	3 SM
105				+		
105 NOTES	: a Some -	mall horizont	ni hed	Idina n'	ing visible	
NAME OF STREET				anny più	The There's City	

During Method Hollow Stam Auger   During Drilling   55.0   Casing Elev.	Pr	oject nam	Goodyea	r Tire	& Rubbe	r Co.		Project N	lo	0376	1-005-00		Boring	No. P8-21
Drilling Firm   Heber Mining Co.   Drilling Method   Heliow Stam Augar   Drilling   S5.0   Drilling Method   Heliow Stam Augar   Drilling   S5.0   1809/5-13-91   Start Date   5														
During Drilling   S5.0	Dr	illing Firm	Heber M	ining (	ю.		Water Leve	els: Dep	th	Elevar	tion Time	/Date		
Hollow-Stem Auger O.D. 87   1.0.3 1/4"   After Drilling   56.0   1800/5-13-91   Start Date 5/13/9   Rotary Bit Dia. N/A Casing Dia. N/A   Well Level   Depth sport page 5.0.   Depth Measured Relative To Grade   Grade   Coged By Barner   Coged By														
Rotary Bit Dia_N/A   Casing Dia_N/A   Depth #assured Relative To Grade   Casing Dia_N/A   Logged By Barner	Ho	llow-Stem	Auger O.D	8"	I.D.3 1									
Depth Measured Relative To Grade   Logged By Barner														
SCALE	To	tal Boring	Depth 95.	0 ft.			Depth Mea	sured Re						
No samples collected from 0.0 ft. to 20.0 ft.   SECT. CONSTRUCTION	SCALE	-	SAMPLE										-	
Predominantly silts, sands, and gravels.	IN	DEPTH	SPT BLOWS				MA	TERIAL DES	SCRIP	TION		TIME	LITH. SECT.	WELL CONSTRUCTION
20.0-21.5 22-28-43 0.8 0.1 ppm	-					No Pre	samples co edominantly :	illected fro silts, sand	m 0.	.0 ft. t	o 20.0 ft			
ppm sand, fine to coarse grained, poorly sorted to mod. well sorted, subang. to subrnd.:	- 15 -					-								
-30 30.0-31.5 50/0.25' 0.25 0.1 ppm SW - Same as above (see 20.0-25.0 ft.).	- 20 - -	20.0-21.5	22-28-43	0.8		sar mo	d, fine to c d. well sorte	oarse grai d. subana	ned.	poorly	sorted to		sw	-
35 ppm	- 25 - -	25.0-26.5	24-43-42	1.0		- sw -	— Same as	above (s	ee 2	0.0-25	.0 ft.).		sw	_
	- - 30 - -	30.0-31.5	50/0.25	0.25		- - sw -	— Same as	obove (s	ee 2	0.0-25	.0 ft.).		sw	-
	35					•								-
		S:												

Pr	oject name	8 Goodyear	Tire o	& Rubber	Co. Project No. 03761-005-00		Boring	NoPB-21
		Goodyear						2 of 3
Dr	illing Firm_	Heber Mi	ining C	o.	Water Levels: Depth Elevation Time	/Date		lev
1		od Hollow S						Elev
					/4" After Drilling <u>56.0</u> 1600/5	-13-91		Date <u>5/13/9</u>
		ia N/A_ C				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Date5/13/9
		Depth 95.						By Barner
SCALE		SAMPLE					cogge	oy borner
IN FEET	DEPTH RANGE	SPT BLOWS	REC.	PID or OVA(1)	MATERIAL DESCRIPTION	TIME	LITH. SECT.	WELL CONSTRUCTION
-	35.0-36.5	50/0.25	0.25	0.1 ppm	SW — Silty gravelly SAND: red.—br.; 60% sand, similar to sample 20.0—25.0 ft.; 30% gravel; 10% silt.		SW	
- 40 	40.0-41.5	29-25-18	0.7	0.1 ppm	- SW — Same as above, except becoming coarser grained.		SW	-
- 45 -	45.0-46.5	4-6-7	0.7	0.1 ppm	CL — CLAY: red.—br.; 100% clay; bottom 2 inche.s is It. br. caliche.		CL	-
- -50 -	50.0-51.5	8-12-21	1.5	0.1 ppm	ML — Sandy SILT: red.—br.; 85% silt; 10% sand, v.f. grained; 5% gravel.		ML	-
- 55 -	55.0-56.5	8-7-7	1.0	0.2 ppm	ML — SILT: red.—br.; 90% silt; 5% clay; 5% grovel.		ML	-
- 60 -	60.0-61.5	12-18-19	1.5	0.2 ppm	CL. — Gravelly silty CLAY: red.—br. to br.; 80% clay; 10% silt; 10% gravel.		CL	-
65	65.0-66.5	9-12-13	0.25	0.2 ppm	CL — Gravelly silty CLAY, similar to sample 60.0 to 65.0 ft.: 60% clay; 20% silt; 10% gravel; 10% sand, med. to coarse grained.		CL	
	7			-			-	
70								
NOTES	. nivu 000	ckground = (	u. i ppi	m				

Pr	oject nam	e Goodyear	Tire	& Rubber	Co. Project No. 03761-005-00	Boring No. PB-21
		Goodyear				Sheet 3 of 3
Dr	illing Firm	Heber M	ining C	o.	Water Levels: Depth Elevation Time/Date	G.S. Elev
					During Drilling <u>55.0</u> 0710/5-20-	
Но	llow-Stem	Auger O.D	8"	I.D. <u>3</u> 1	/4" After Drilling <u>56.0</u> 1600/5-13-9	21 Start Date 5/13/91
		ia. <u>N/A</u> C				Finish Date5/13/91
		Depth 95.	o ft.		Depth Measured Relative To Grade	
SCALE	DEPTH	SAMPLE SPT BLOWS	REC.	PID or	MATERIAL DESCRIPTION	E LITH. WELL
FEET	RANGE	per 6 in.		OVA(1)	IIM	SECT. CONSTRUCTION
-	70.0-71.5	?	1.5	0.2 ppm	SC — Clayey SAND: red.—br.; 80% sand, med. to coarse grained, subang. to subrnd., mod. well to well sorted; 10% clay; 5% silt; 5% gravel.	sc
-75 - -	75.0-76.5	12-12-24	1.5	0.1 ppm	SW — SAND: red.—br.; 90% sand, med. to coarse grained, same as 70.0 to 75.0 ft.; 5% silt; 5% gravel.	sw -
- 	80.0-81.5		0		Running sand problems, no sample collected, auger to 85 ft.	
- - 85 -	85.0-86.5		0	-	Running sand problems, no sample collected, auger to 90 feet.	
- -90	90.0-91.5		0		Still having problems with running sands. Auger to 95.0 feet.	-
95	95.0-96.5		0		Running sand — no sample Terminate boring.	
100	POPPO OF THE CONTRACTOR OF THE	The state of the s				
				[		
105						
NOTES	:					

-15 -20 20.0-21.5 50/4* 0.3 0.6 ppm	Locatio Drilling Drilling Hollow- Rotary	nGoodyea	tr. Arizona - PG tining Co. Stem Auger D. 8" I.D. 3 Casing Dia. N. 97,0 ft.	Water Levels:   Depth   Elevation   Time	/Date 5-16-91	Sheet 1 of 3 G.S. Elev. Casing Elev. Start Date 5/15/9 Finish Date5/16/9 Logged By J. Moore
-10  -20 20.0-21.5 50/4" 0.3 0.6 Ppm silt, Gravelly SANDS: br.; 20% silt, non-plastic; 50% sand, mostly coarse to fine grained; 30% gravels, with ang. to subang, coarse to dominantly fine gravels, poorly sorted; dry.  -25 25.0-26.5 10-12-16 1.5 0.8 Ppm 20% silt, non-plastic; 65% sand, coarse to dominately dry.  -30 30.0-31.5 9-12-13 0.8 0.2 Ppm SW - Silty Gravelly SANDS: dill redbr.; 20% silt, non-plastic; 65% sand, coarse to dominately dry.  -30 30.0-31.5 9-12-13 0.8 0.2 SW - Silty Gravelly SANDS: dk. br.; 10% silt, non-plastic; 70% sand, ang. to subang, with coarse to fine, dominately dry.  -30 30.0-31.5 9-12-13 0.8 0.2 SW - Silty Gravelly SANDS: dk. br.; 10% silt, non-plastic; 70% sand, ang. to subang, with coarse to fine, dominately dry.  -30 30.0-31.5 9-12-13 0.8 0.2 SW - Silty Gravelly SANDS: dk. br.; 10% silt, non-plastic; 70% sand, ang. to subang, with coarse to fine, dominately dry.  -30 30.0-31.5 9-12-13 0.8 0.2 SW - Silty Gravelly SANDS: dk. br.; 10% silt, non-plastic; 70% sand, ang. to subang, with coarse to fine, dominately dry.  -30 30.0-31.5 9-12-13 0.8 0.2 SW - Silty Gravelly SANDS: dk. br.; 10% silt, non-plastic; 70% sand, ang. to subang, with coarse to fine, dominately dry.	IN DE	PTH SPT BLOWS	REC. PID or	MATERIAL DESCRIPTION	TIME	LITH. WELL SECT. CONSTRUCTION
ppm silt, non-plastic; 50% sand, mostly coarse to fine grained; 30% gravels, with ang. to subang., coarse to dominantly fine gravels, poorly sorted; dry.  SW - Silty Gravelly SANDS: dull redbr.; 20% silt, non-plastic; 65% sand, coarse to fine grained; 25% gravels, coarse to dominately fine, subang, to ang. gravels, poorly sorted; dry.  SW - Silty Gravelly SANDS: dull redbr.; 20% silt, non-plastic; 65% sand, coarse to fine grained; 25% gravels, poorly sorted; dry.  SW - Silty Gravelly SANDS: dk. br.; 10% silt, non-plastic; 70% sand, ang. to subang., with coarse to fine, dominately med. grained sands; 20% gravels; ang. to subang.; dry	- 5 - 5 - 10 - 15					
SW — Silty Gravelly SANDS: dull red.—br.; 20% silt, non—plastic; 65% sand, coarse to fine grained; 25% gravels, coarse to dominately fine, subang. to ang. gravels, poorly sorted;  SW — Silty Gravelly SANDS: dk. br.; 10% silt, non—plastic; 70% sand, ang. to subang., with coarse to fine, dominately med. grained sands; 20% gravels; ang. to subang.; dry  SW — Silty Gravelly SANDS: dk. br.; 10% silt, non—plastic; 70% sand, ang. to subang., with coarse to fine, dominately med. grained sands; 20% gravels; ang. to subang.; dry	-20 20.0-	-21.5 50/4"		silt, non-plastic; 50% sand, mostly coarse to fine grained; 30% graveis, with ang. to subang., coarse to dominantly fine gravels,	< 1257	
ppm   SW - Silty Gravelly SANDS: dk. br.; 10%   Silt, non-plastic; 70% sand, ang. to subang., with coarse to fine, dominately med. grained sands; 20% gravels; ang. to subang.; dry to moist.	-25 25.0-	-26.5 10-12-16		20% silt, non-plastic; 65% sand, coarse to fine grained; 25% gravels, coarse to dominately fine, subang, to ang. gravels, poorly sorted;	< 1307	sw -
35	-30 30.0-	-31.5 9-12-13		silt, non-plastic; 70% sand, ang. to subang., with coarse to fine, dominately med. grained sands; 20% gravels; ang. to subang.; dry	< 1317	SW -
	35					-

Rot Tot	llow—Stern tary Bit Di al Boring	Auger O.D. ia. N/A C	8" asing	_1.D Dia	3" After Drilling		Start D	Elev ate_5/15/ Oate5/16/ By J. Moc
CALE IN EET	DEPTH	SAMPLE SPT BLOWS	REC.		MATERIAL DESCRIPTION	TIME	LITH.	WELL
	RANGE 35.0-36.5	per 6 in. 25-18-21	1.0	OVA(1) 0.0 ppm	GM — Sandy Silty GRAVEL: br.; 30% silt, non-plastic to v. low plasticity; 15% sand, coarse to fine grained, mostly med. grained.; 55% gravel, med. to fine, subrnd. to subang., poorly sorted; moist.	< 1322		ONSTRUCTI
40	40.0-41.5	9-6-7	1.5	0.0 ppm	— SM — SILT and SAND: br.; 50% siit, non-plastic; 50% sand, med., to fine grained, well sorted; wet.  SC/SM — Sandy Clayey SILT: br.; 80% siit,	< 1338 40.5	SM SC/	
45	45.0-46.5	26-18-15	1.3	0.6 ppm	non-plastic; 10% clay; 10% sand, med. to fine grained, firm, layered, mod. sorted;  wet.  ML — Sandy SILT: br.; 60% silt, non-plastic to very low plasticity, trace amount of bedding plains visible; 40% sand, med. to dominantly fine grained, with increasing % of sand with depth, subrnd. sand grains; wet.	5/16/91 < 0530	SM	
50	50.0-51.5	4-6-7	1.4	0.0 ppm		< 0550	ML	
55	55.0-56.5	4-6-5	1.2	0.0 ppm	-ML - Sandy SILT: br.; 85% silt, non-plastic; 15% sand, coarse to mostly fine grained sands; mod. to well sorted; moist.	< 0600	ML	
60 4	60.0-61.5	6-6-4	0.9	0.0 ppm	- ML/SM — Sandy SILT: br.; 90% silt, non-plastic; 10% sand, med. to mostly fine grained, moist. Grading to: SAND and SILT; br.; 50% silt, non-plastic; 50% sand, med. to mostly fine grained; moist.	< 0600	ML/ SM	
5	\$5.0-66.5	5-7-4	1.1	0.2 ppm	SM/ML — SILT and SAND: br.; 50% silt, non-plastic; 50% sand, med. to mostly fine sands, mod. sorted. Grading to: 70% sand, subang. to subrnd. grains; 25% gravels, subang. to subrnd.; 5% silt, poorly sorted; moist to wet.	< 0618	SM/ ML	

Location Goodyear, Arizona - PGA Site  Drilling Firm Heber Mining Co.  Drilling Method Hollow Stem Auger  Hollow-Stem Auger O.D. 8" I.D. 3"  Rotary Bit Dia. N/A Casing Dia. N/A  Total Boring Depth 97.0 ft.  Depth Measured Relative To Grade  Well Level  Depth Measured Relative To Grade  Depth Material Description  Time Date Sy15/8/31  Finish D	Pr	oject name	8 Goodyear	Tire	& Rubbe	Co. Project No. 03761-005-00	Boring No. PB-22
Drilling Firm   Heber Mining Co.   Drilling Method Hellow Stem Auger   Drilling Method Hellow Stem Auger   During Drilling   40.5'   1336/5-18-9'   Casing Elev.	1						
During   D	Dri	illing Firm	Heber Mi	ning (	Co.	Water Levels: Depth Elevation Time/Date	
Hollow-Stem Auger 0.0_8"   I.D. 3"   After Drilling   Start Date 5/15/91	ŧ.						
Rotary Bit Dia	Но	llow-Stem	Auger 0.D.	. 8"	_1.D;	The second secon	
Depth   SAMPLE   No.   Depth   SAMPLE   No.   Depth   SAMPLE   No.   Depth   SAMPLE   No.   Depth   SAMPLE   No.   Depth   SAMPLE   No.   Depth   SAMPLE   No.   Depth   SAMPLE   No.   Depth   SPT BLOWS   REC.   PID or   Popf 6 in   No.   O.   O.   Depth   Sec.   Depth   Sec	Ro	tary Bit Di	ia. N/A C	asing	DiaN		
SAMPLE   SAMPLE   No.   DEPTH   SPT BLOWS   REC.   PID or   Part   No.   Part   Part   No.   Part   Part   No.   Part	Tot	tal Boring	Depth	97,0	ft.	Depth Measured Relative To Grade	1
N	SCALE		SAMPLE				
SW - Gravelly SAND: br.; 70% sand, mostly coarse to fine grained, with ang. to subrnd. sonds; 30% gravels, med. to fine gravels, subrnd. sonds; 30% gravels, med. to fine gravels, subrnd. sonds; 30% gravels, med. to fine gravels, subrnd. to rnd.; wet.   SW - Gravelly SANDS: br.; 80% sands, coarse to fine grained, mostly med. sands; 20% gravel med. to fine gravels, subang. to subrnd. poorly sorted; wet.   SW - Gravelly SANDS: br.; 85% sand, coarse to fine grained, mostly med.; 15% gravels, med. to mostly fine, subang. to subrnd. gravels, med. to mostly fine, subang. to subrnd. gravels poorly sorted; wet.   SW - Gravelly SANDS: br.; 25% silt, non-plostic; 50% sand, coarse to fine, mostly med. grained sands, with subang. to subrnd. gravels, gravels, med. to fine, angular to subrnd. gravels, poorly sorted; wet.   SW - Gravelly SANDS: br.; 25% sand, coarse to fine, mostly med. grained sonds, with subang. to subrnd. gravels, poorly sorted; wet.   SW - Gravelly SINTY SANDS: br.; 45% sand, coarse to fine, angular to subrnd. gravels, poorly sorted; wet.   SW - Gravelly SINTY SANDS: br.; 45% gravels, coarse to mostly fine gravels, ang. to subrnd. poorly sorted; wet.   SW - Gravelly SINTY SANDS: br.; 10% silt, non-plostic; 70% sand, coarse to fine grained, mostly med. sands; 15% gravels, med. to mostly fine gravels, ang. to subrnd.; wet		DEPTH RANGE	per 6 in.		OVA(1)	MATERIAL DESCRIPTION TIME	LITH. WELL SECT. CONSTRUCTION
ppm	-	70,0-71,5	5-4-6	0.3		coarse to fine grained, with ang. to subrnd sands; 30% gravels, med. to fine gravels.	32 SW
to fine grained, mostly med.; 15% gravels, med. to mostly fine, subang. to subrnd. gravels poorly sorted; wet.  -85 85.0-86.5 9-7-7 0.7 0.0 ppm  SW/SM - Sitty Gravelly SANDS: br.; 25% silt, non-plastic; 50% sand, coarse to fine, mostly med. grained sands, with subang. to subrnd. graine; 25% gravels, med. to fine, angular to subrnd. gravels, poorly sorted; wet.  -90 90.0-91.5 8-8-6 0.3 0.0 ppm  SM/SP - Gravelly Sitty SAND: br.; 45% sand, coarse to mostly fine grained. Grading to 40% silt, non-plastic to very low plasticity; 15% gravels, coarse to mostly fine gravels, ang. to subrnd., poorly sorted; wet.  -95 95.0-96.5 10-9-8 0.2 0.0 ppm  SP - Sitty Gravelly SANDS: br.; 10% silt, non plastic; 70% sand, coarse to fine gravels, mostly med. sands; 15% gravels, med. to mostly fine gravels, ang. to subrnd.; wet	75 	75.0-76.5	7-6-4	0.5	0.0 ppm	coarse to fine grained, mostly med, sands; 20% gravel med, to fine gravels.	7 SW -
silt, non-plastic; 50% sand, coarse to fine, mostly med. grained sands, with subang. to subrnd. gravels, poorly sorted; wet.  SM/SP — Gravelly Silty SAND: br.; 45% sand, coarse to mostly fine grained. Grading to 40% silt, non-plastic to very low plasticity; 15% gravels, coarse to mostly fine gravels, ang. to subrnd., poorly sorted; wet.  SP — Silty Gravelly SANDS: br.; 10% silt, non plastic; 70% sand, coarse to fine grained, mostly med. sands; 15% gravels, med. to mostly fine gravels, med. to mostly fine gravels, med. to mostly fine gravels, ang. to subrnd.; wet	- -80 -	80.0-81.5	8-6-7	0.3	1	to fine grained, mostly med.; 15% gravels, med. to mostly fine, subana, to suband gravels	9 SW -
ppm sand, coarse to mostly fine grained. Grading to 40% silt, non-plastic to very low plasticity; 15% gravels, coarse to mostly fine gravels, ang. to subrnd., poorly sorted; wet.  SP — Silty Gravelly SANDS: br.; 10% silt, non plastic; 70% sand, coarse to fine grained, mostly med. sands; 15% gravels, med. to mostly fine gravels, ang. to subrnd.; wet	- 85 - 85	85.0-86.5	9-7-7	0.7		silt, non-plastic; 50% sand, coarse to fine, mostly med. grained sands, with subang. to subrnd. grains; 25% grayels, med. to fine	- 1 - 1/
pprn non plastic; 70% sand, coarse to fine grained, mostly med. sands; 15% gravels, med. to mostly fine gravels, ang. to subrnd.; wet	-90 -	90.0-91.5	8-8-6	0.3	0.0 ppm	sand, coarse to mostly fine grained. Grading to 40% silt, non-plastic to very low plasticity; 15% gravels, coarse to mostly fine gravels.	
Bottom of boring 97.0 ft.	-95	95.0-96.5	10-9-8	0.2		non plastic; 70% sand, coarse to fine grained, mostly med. sands; 15% gravels, med. to	7 SP
						Bottom of boring 97.0 ft.	-
100	100						
							-
105	105						
IOTES: * Boring terminated at a depth of 97.0 ft. because of running sands.	NOTES	: * Boring	g terminated	at a	depth of	97.0 ft. because of running sands.	

					Co. Project No. 03761-005-00		Boring No. PB-23
Loc	ation	Goodyear	, Arizo	ona - Pi	A Site		Sheet 1 of 1
Dril	ling Firm_	Heber Mi	ning C	ò	Water Levels: <u>Depth</u> <u>Elevation</u> Time	/Date	G.S. Elev
Dril	ling Metho	d Hollow S	tem A	uger	During Drilling Not available		Casing Elev.
Hol	low-Stem	Auger O.D.	8"_	_1.D			Start Date 5/15/
Rot	ary Bit Di	a. N/A C	asing	Dia N			Finish Date5/15/
Tota	al Boring	Depth 28.	O ft.		Depth Measured Relative To Grade		Logged By J. Moor
CALE		SAMPLE					
IN EET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION	TIME	SECT. CONSTRUCTION
-							
5					-		
					¥		
10							
15							
				1			
					4		
20	20.0-21.5	50/3"	0.2	0.0 ppm	GW — Gravelly silty SAND: redbr.; 5% silt, non-plastic to very low plasticity; 70%	< 1059	GW GW
					sand, fine to coarse grained, subrad, to		
					subang.; 25% gravels, ang., poorly sorted; dry.		
25	25.0-26.5	50/1"	NR	NA -	No progress		
-	20.0 20.0	30/1	1412	INA	NO RECOVERY.	< 1111	
_					AUGER REFUSAL 9 28.0 FT		
					Bottorn of boring @ 28.0'		
50				1			
No.				-			
				-			
				-			
				-	The state of the s		
35	a Original	noil /oilet h	princ 1	00045	as abandoned @ a depth of 14.5 ft. (location w		

Dr Dr Ho Ro To	rilling Firr filling Met billow—Ste stary Bit tal Boring	Goody Theber thod Hollow The Auger O Dia. N/A g Depth 6	Mining ( Stem A D. 8" Casing (7.0 ft.	ond — PG/ Co. uger _1.D3** DiaN/	Water Levels:         Depth	Boring No. PB- Sheet 1 of 2 G.S. Elev. Casing Elev. Start Date 5/23 Finish Date5/23, Logged By J. Mo
FEET	DEPTH RANGE	SPT BLOW per 6 in	/S REC.	PID or OVA(1)	MATERIAL DESCRIPTION TIME	LITH. WELL SECT. CONSTRUCT
5 10	10.0-11.5	5 14-21-50	0.5		M — Silty SAND: br.; 10% silt, non-plastic to   < 0634   top   SM	
-15					rained, mostly fine sands, "caliche", poorly cemented; dry.	
20 2	20.0-21,5	2940- 50/4	0.7	[ m	- Silty gravelly SAND: br.; 5% silt, non- stic; 70% sand, coarse to fine grained, stly med. sands; 25% gravels, med. to stly fine, subang., to subrnd., poorly ted, poorly cemented; dry.	sw
25 2	5.0-26.5	16-20-32		0.0 Sypm	- Same as above; dry.	SW -
30 30	0.0-31.5	50/6°		CO	res to fine, mostly fine, ang. to subrad. rels; hard, dense "streambed type" deposits.	SW
5				of 12.0 ft		

Pr	oject name	a Goodyear	Tire	& Rubbe	r Co. Project No. 03761-005-00		Boring	NoPB-24
Lo	cation	Goodyear	, Arizo	ong - P	GA Site			2_of_2
Dr	illing Firm_	Heber Mi	ning C	io.	Water Levels: Depth Elevation Time	/Date		lev
Dr	illing Metho	od Hollow St	tem A	uger	During Drilling <u>45.0</u> 0737/5	-23-91		Elev.
Но	llow-Stem	Auger O.D.	. 8"	_1.0				Octo 5/23/91
Ro	tory Bit Di	ia. <u>N/A</u> C	asing	Dia. N				Date5/23/91
To	tal Boring	Depth 67.0	O ft.		Depth Measured Relative To Grade			By J. Moore
SCALE	The second secon	SAMPLE				T		
FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION	TIME	SECT.	WELL CONSTRUCTION
-	35.0-36.5	50/6"	0.4	1.0 ppm	SW — Silty gravelly SAND: br.; 5% silt; 60% — sand, coarse to fine sands, mostly med. grained; 35% gravels, coarse to mostly fine, ang. to subang. gravels, poorly sorted; dry to moist.	< 0718	-	
40  -	40.0-41.5	50/6"	0.3	O.6 ppm	GW — Silty sandy GRAVELS: br.; 10% silt, non—plastic; 40% sand, coarse to fine, mostly med. 50% gravels, coarse to fine,, mostly fine, subang, to subrnd., hard, dense, poorly cemented; moist.	< 0730	GW	
- 45 -	45.046.5	50/5"	NR	NA	No recovery.	< 0737	WET Ø 45'	
-50	50.0-51.5	50/5"	0.3	0.0 ppm	GW — Silty sandy GRAVEL: br.; 5% silt, non— plastic; 35% sand, coarse to fine, mostly fine sands; 60% gravels, coarse to mostly fine, submd. to subang., poorly sorted, "streambed deposits"; wet.	< 0748	GW	
-55 -	55.0-56.5	11-17- 50/5	0.6	0.0 ppm	GW — Sandy GRAVEL: br.; 35% sand, coarse to fine, mostly med. sands; 65% gravels, coarse to fine, mostly fine, submd. to rnd., "streambed deposits"; wet.	< 0800	GW	
-60	60.0-61.5	50/6"	NR	NA -	No recovery.	< 0815		-
-65	65.0-66.5	50/3*	NR	NA .	No recovery.	< 0831		-
				-	Bottom of boring @ 67.0 ft.			
70								
NOTES	: Augers ar Boring ter	e unable to	contin	ue down	ward borehole advancement because of auger tee	th worn	out.	

P	roject nam	eGoodyea	r Tira	& Rubb	er Co. Project No. 03761-005-00	Boring No. PB-27
					GA Site	Sheet 1 of 3
					Water Levels: Depth Elevation Time/Date	G.S. Elev.
					During Drilling 55.0' 0615/5-15-9	
H	ollow-Stem	Auger O.D	. 8"	I.D.3	1/4" After Drilling 64.0' 0800/5-15-9	Stort Date 5/14/91
Ro	otary Bit D	ia. N/A (	Casing	Dia	VA Well Level	Finish Date5/15/91
To	tal Boring	Depth	97.0	ft.		
SCAL	E	SAMPLE				
FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION TIME	LITH. WELL SECT. CONSTRUCTION
5 - 10					No samples collected from 0.0 to 20.0 ft. This zone is characterized by gravels, silts and sands.	
- -15 - - - -	20.0-21.5	30-50/.5'	1.5		ML — SILT, gravelly silt: lt. red.—br.; 90%	
				ppm	silt; gravei, clay and sand make up remaining 10%.	ML
-25	25.0-26.5	12-15-23	1.5	O.2 ppm	ML — Clayey SILT: It. br.; 80% silt; 20% clay, brittle, but has cohesion.	ML -
-30	30.0-31.5	50/0.41	1.0	0.2 ppm	ML — Upper 4 inches same as above SW — Lower 6 inches silty gravelly SAND: red.— br.; 70% sand, poorly sorted, subang, to subrnd.; 25% gravel; 5% clay.	ML SW
35				45.494.05.2	31 S 100 - 1	
NOTES	S: HNu back	ground = 0.	1 ppm	1		

Dorolling Firm	Pro	oject nam	<b>e</b> Goodyear	Tire	& Rubbe	Co. Project No. 03761-005-00	Boring No. PB-27/
Drilling   Firm   Helbert Mining   Co.   Drilling   Method   Hollow   Stem   Auger   During   Drilling   Drilling   Sst.   During   Drilling   Sst.   Drilling   Drilling   Sst.   Drilling   Sst.   Drilling   Sst.   Drilling   Drilling   Sst.   Drilling   Drilling   Sst.   Drilling   Drilling   Sst.   Drilling   Drilling   Sst.   Drilling   Drilli	Loc	cation	Goodyear	, Arizo	ona - Po	A Site	
During Drilling   St.0"   0615/5-15-91   Casing Elev.	Dri	lling Firm	Heber Mi	ning (	ю	Water Levels: Depth Elevation Time/Date	
Hollow-Sterm Auger Q.D. 6"   L.O.3 1/4"   After Drilling   54.0"   Q800/5-15-91   Start Date 5/14/9   Finish Date 5/14/9   Finish Date 5/15/9   Logged By Barner	Dril	lling Metho	od Hollow St	tem A	uger	During Drilling 55.0' 0615/5-15-9	
Rotary   Bit   Dia_N/A   Cosing   Dia_N/A   Depth	Hol	low-Stem	Auger O.D.	. 8"	_1.D. <u>3</u>	/4" After Drilling 64.0' 0800/5-15-9	Start Date 5/14/9
Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Soring   Depth   Depth   Soring   Depth	Rot	tary Bit Di	ia. N/A C	asing	Dig. N	/A Well Level	
N DEPTH   SPENCWS   Per 6 in   Ova(1)   Depth   SPENCWS   Per 6 in   Ova(1)   Depth   SPENCWS   Per 6 in   Ova(1)   Depth   SPENCWS   Section   Ova(1)   Depth   Ova(1)   Dep	Tot	al Boring	Depth	97.0	ft.	Depth Measured Relative To Grade	
ML = Upper 5 inches, some as above   GP = Lower 7 inches, some as above   GP = Lower 7 inches sondy GRAVEL redbr.;   60% grovel, gng. to subong.; 40% sond, ong. to subong. fine to coorse grained, poorly sorted, subong.   50% south, gng. to subong.; 40% sond, ong. to subong.; 10% sond, ong. to subong. to subong.; 10% sond, ong. to subong. to subong.; 10% clay.    SW   SW   SW   SW   SW   SW   SW   S	SCALE		-				
-40 40.0-41.5 27-55/0.4* 1.0 0.2 ppm   -45 45.0-46.5 50/0.4* 0.4* 0.6 ppm   -46 50.0-61.5 50/0.4* 0.4* 0.6 ppm   -47 60 60.0-61.5 24-13-20 1.4 0.2 ppm   -48 65 65.0-66.5 4-4-8 1.0 0.2 ppm   -49 65 65.0-66.5 4-4-8 1.0 0.2 ppm   -40 60.0-41.5 27-55/0.4* 1.0 0.2 ppm   -40 60.0-41.5 27-55/0.4* 1.0 0.2 ppm   -45 45.0-46.5 50/0.4* 0.4* 0.6 ppm   -45 45.0-46.5 50/0.4* 0.4* 0.6 ppm   -45 45.0-46.5 50/0.4* 0.4* 0.6 ppm   -45 45.0-46.5 50/0.4* 0.4* 0.6 ppm   -45 45.0-46.5 50/0.4* 0.4* 0.6 ppm   -45 45.0-46.5 50/0.4* 0.4* 0.6 ppm   -46 60 60.0-51.5 50/1.5* 1.5* 0.2 ppm   -47 60 60.0-51.5 50/1.5* 0.2 ppm   -48 7 60 80.0-61.5 24-13-20 1.4 0.2 ppm   -48 80 80 80 80 80 80 80 80 80 80 80 80 80	FEET	RANGE	per 6 in.	REC.		MATERIAL DESCRIPTION TIME	SECT. CONSTRUCTION
send, poorly sorted, ong. to subong. mineral constituents/rock types of gravels include oilvines, quartz feldspothoids, and ferromagnesium; 30% clay; 20% sand, fine to coarse grained, subong. to sub	-	35.0-36.5	54/0.5			60% gravel, ang. to subang.; 40% sand, ang. to subang., fine to coarse grained, poorly	
Solution	40 	40.0-41.5	27-55/0.4	1.0		subring.; 25% gravel, and, to subrind.: 5%	sw -
ppm  ang. to subang., mineral constituents/rock types of gravels include alivines, quartz feldspathaids, and ferromagnesium; 30% clay; 20% sand, fine to coarse grained, subang.  ang. to subang., mineral constituents/rock types of gravels include alivines, quartz feldspathaids, and ferromagnesium; 30% clay; 20% sand, fine to coarse grained, subang.  ang. to subang., mineral constituents/rock types of gravels include alivines, quartz feldspathaids, and ferromagnesium; 30% clay; 30% sand; 10% clay; sample similar to (50.0–55.0).  SP — Upper 4" red.—br.; 100% SAND, very fine grained with a trace of silt (60 — Upper middle 4" clayey gravelly SAND; red.—br.; 40% sand, fine to coarse grained, subang. to subrnd., mod. well sorted; 30% gravel, up to 1/4 inch in diameter, 30% clay gravel, up to 1/4 inch in diameter, 30% clay SW — Lower middle 5" SAND; red.—br.; 50% sand, trace of silt, fine to coarse grained, poorly sorted, subang. to subrnd. CL — Bottom 3" silty CLAY: red.—br.; 70% clay; 30% silt.  SP — Upper 9" silty gravelly SAND; red.—br.; 70% sand, same as previous descriptions on sorting and rounding, fine to coarse grained; 30% gravel, up to 1/4 in size.  CL — Lower 3" silty CLAY: red.—br.; 70% clay; 30% silt.	- <b>4</b> 5	45.0~46.5	50/0.4	0.4'		gravel, up to 1 inch in diameter; 30% silt; 20% sand, fine to coarse grained, subana, to	GM -
ppm   Solid State   Solid Stat	-50	50.0-51.5	50/1.5*	1.5"		types of gravels include alivines, quartz feldspathoids, and ferromagnesium; 30% clay; 20% sand, fine to coarse grained subang	GC -
fine grained with a trace of silt  GC — Upper middle 4" clayey gravelly SAND: red.—br.; 40% sand, fine to coarse grained, subang. to subrnd,, mod. well sorted; 30% gravel, up to 1/4 inch in diameter, 30% clay gravel, up to 1/4 inch in diameter, 30% clay SW — Lower middle 5" SAND: red.—br.; 100% sand, trace of silt., fine to coarse grained, poorly sorted, subang. to subrnd. CL — Bottom 3" silty CLAY: red.—br.; 70% clay; 30% silt.  SP — Upper 9" silty gravely SAND: red.—br.; 70% sand, same as previous descriptions on sorting and rounding, fine to coarse grained; 30% gravel, up to 1/4" in size. CL — Lower 3" silty CLAY: red.—br.; 70% clay; 30% silt.	-55	55.0-56.5	21-17-18	3"		30% sand; 10% clay; sample similar to	GC -
clay; 30% silt.  SP - Upper 9" silty graveliy SAND: redbr.; 70% sand, same as previous descriptions on sorting and rounding, fine to coarse grained; 30% gravel, up to 1/4" in size.  CL - Lower 3" silty CLAY: redbr.; 70%  CL	-60	60.0-61.5	24-13-20	1.4		fine grained with a trace of silt GC — Upper middle 4" clayey gravelly SAND: red.—br.; 40% sand, fine to coarse grained, subang. to subrnd,, mod. well sorted; 30% gravel, up to 1/4 inch in diameter, 30% clay gravel, up to 1/4 inch in diameter, 30% clay SW — Lower middle 5" SAND: red.—br.; 100% sand, trace of silt., fine to coarse grained, poorly sorted, subang. to subrnd. CL — Bottom 3" silty CLAY: red.—br.; 70%	GC SW
70	-65	85.0-86.5	4-4-8	1.0		clay; 30% silt.  SP — Upper 9" silty gravely SAND: red.—br.; 70% sand, same as previous descriptions on sorting and rounding, fine to coarse grained; 30% gravel, up to 1/4" in size.  CL — Lower 3" silty CLAY: red.—br.; 70%	SP -
	70				t		
iOTES: # Wet @ approximately 55.0 ft.		+ Wet @	approximately	55.0	ft		

Pr	oject name	Goodyear	Tire	& Rubbe	r Co. Project No. 03761-005-00		Boring	No. PB-27
1		Goodyear						3 of 3
Dri	illing Firm_	Heber Mi	ining C	Co	Water Levels: Depth Elevation Time	/Date		lev.
					During Drilling 55.0 0615/5		Casino	Elev.
Но	llow-Stem	Auger O.D.	. 8"	I.D.3	1/4" After Drilling 64.0' 0800/5	-15-91	Start	Date 5/14/9
Ro	tary Bit Di	a. N/A C	asing	Dia. N	/A Well Level			Date5/15/9
Tot	tal Boring	Depth	97.0	ft.		The same of		d By Barner
SCALE	DEPTH	SAMPLE	Loca	Total	MATERIAL DESCRIPTION		LITU	Men
FEET	RANGE	SPT BLOWS per 6 in.		OVA(1)	MATERIAL DESCRIPTION	TIME	SECT.	WELL CONSTRUCTION
	70.0-71.5	7-9	0.5	0.2 ppm	SC/GC — Upper 3" siity gravelly SAND: red.— br.; 40% sand, fine to coarse, subang, to subrnd., poorly sorted; 30% gravels; 30% clay. CL — Bottom 3" siity CLAY: red-br.; 60% clay; 40% siit.		SC/ GC CL	
75	75.076.5	5-7-9	1.4	0.1 ppm	SP — Upper 1.2 ft. grovelly SAND: 85% sand, fine to v. coarse grained; poorly to mod. well sorted, subong. to subrnd.; 15% gravels up to 3/4" in diameter. CL — Bottom 0.2' gravelly CLAY: 85% clay; 15% gravel.		SP	
- 80 - -	80.0-81.5	5-5-5	1.5	0.1 ppm	SW — Upper 15" SAND: 100% sand, fine to very coarse, same as described in 75.0—80.0 ML — Bottom 3" clayey SILT: 70% silt; 30% clay.		SW	
- 85 - -	85.0-86.5	50/1"	8"	0.1 ppm	SW - Similar to above sample 80.0-85.0 ft. Upper 5" as above, fine to very coarse sand. SM/SC - Bottom 3" silty clayey SAND: 50% sand; 30% clay; 20% silt.		SW SM/ SC	
- -90 -	90.0-91.5		0		Running sand — no sample.			_
- - -95	95.096.5		0		Running sand — no sample. Terminated boring.			-
100				-	Bottom of boring @ 97.0 ft.		T I T I T T T T T T T T T T T T T T T T	-
105				+	K			
105 NOTES	:							

Pre	oject name	e Goodyear	Tire	& Rubbe	r Co. Project No. 03761-005-00		Borino	No. P8-28/
1		Goodyear						3 of 4
Dri	illing Firm_	Heber Mi	ning (	ò	Water Levels: Depth Elevation Time	/Date		lev
Dri	lling Metho	od Hollow S	tem A	uger				
Но	llow-Stem	Auger O.D.	. 8"	_1.D.3	/4" After Drilling 41.8' 5-15	91		Date <u>5/14/9</u> 1
		ia. N/A C						Date 5/15/91
Tol	tal Boring	Depth	106.5	ft.	Depth Measured Relative To <u>Grade</u>			d By Barner
SCALE		SAMPLE			MATERIAL OSSOCIUTION	T	Low	Talenta i
FEET	DEPTH RANGE	SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION	TIME	SECT.	WELL CONSTRUCTION
-	70.0-71.5	6-4-8	1.5	0.2 ppm	SP — Same as above — 95% sand; 5% silt.	< 0840	SP	-
- - 75 -	75.0-76.5	4-8-9	1.5	0.2 ppm	- SP — Same as above — except 95% sand; 5% silt and gravels.	< 0850	SP	-
80	80.0-81.5	4-4-6	1.5	0.2 ppm	- SP Same as 75-80'. Base of sample 2" of redbr. silt. V. brittle, firm; moist but not wet.	< 0900	SP	-
- 85	85.0-86.5	4-6-5	1.0	0.2 ppm	ML — SILT: red.—br.; 100% silt, firm but brittle, moist but not wet, could act as an aquitard.		ML	-
90	90.0-91.5	3-3-6	0.7	0.2 ppm	- CL - Silty sandy CLAY: redbr.; 90% clay; 5% silt; 5% sand.		CL	-
-95	95.0-96.5	4-4-6	1.5	0.2 ppm	- SP - SAND: redbr.; 100% sand, med. to coarse grained, subang. to subrnd., moderately well sorted.	·	SP	
100	100.0- 101.5		1.0	0.2 ppm	-SP — Same as above (90—95'); trace silt.		SP	-
					The second secon			-
105								
NOTES	111101 6	background (	0.2 pp	m @ 08	00			
	HILL (	annulus read	ing U.	∠ ppm €	0020			

	,	e Goodyed	iare	& Rubbe	r Co. Project No. 03761-005-00		Boring	No. 1-20
Lo	cation	Goodyea	r, Ariza	ona - Po	A Site			1 of 4
Dr	illing Firm	Heber M	ining (	Co.	Water Levels: Depth Elevation Time			lev.
		od Hollow S						
					/4" After Drilling 41.8' 5-15			Date 5/14/9
		ia. N/A C						Date5/15/9
		Depth						
CALE		SAMPLE					rogged	By Borner
IN FEET	DEPTH	SPT BLOWS per 6 in.	REC.		MATERIAL DESCRIPTION	TIME	LITH.	WELL CONSTRUCTION
	IONIVOL	per o m.	+	OVA(1)			3201.	CONSTRUCTIO
- 5 5					No samples collected first 20 feet — This zone is characterized by silts, gravels and sands.			
-15						10		
-20	20.0-21.5	50/0.4	0.4	0.2 ppm	SM/GM — Gravelly silty SAND: It. br.; 40% very fine to coarse sand, subang. to subrnd., poorly sorted; 40% silt; 30% gravel, up to 1.25".	< 0645	SM/ GM	
25	25.0~26.5	31-35-38	1.0	0.2 ppm	- GW — Silty sandy GRAVEL: it. br. to red.—brown; 50% gravel, ang. to subrnd., variable color and mineral composition; 40% sand, fine to coarse grained, poorly sorted, subang. to subrnd.; 10% silt.	< 0700	GW	
-30	30.0~31.5	50/0.4'	0.3	0.2 ppm	- P - Grovelly SAND: as above except greater percentage of sand (60%), trace silt.	< 0705	SP	-
		-		-				
35								

Pr	oject nam	e Goodyea	Tire	& Rubbe	r Co. Project No. 03761-005-00		Boring No. PB-1	28/
		Goodyear					Sheet 2 of 4	
Dr	illing Firm	Haber M	ining (	Co	Water Levels: <u>Depth</u> <u>Elevation</u> <u>Time</u>	/Date	G.S. Elev.	
Dr	illing Meth	od Hollow S	tem A	uger	During Drilling0745/5	5-15-91		
Ho	llow-Stem	Auger O.D	8"_	_l.D3_	1/4" After Drilling41.8' 5-1	5-91	Start Date 5/14	
Ro	otary Bit D	iaN/A0	asing	Dia. N	/A Well Level		Finish Date5/15	
To	tal Boring	Depth	106.5	ft.	Depth Measured Relative To Grade		Logged By Barne	r
SCALE		SAMPLE			WITTOWN OFFICENCES		1	
FEET	100105	SPT BLOWS per 6 in.		PID or OVA(1)	MATERIAL DESCRIPTION	TIME	SECT. CONSTRUCT	TION
-	35.0-36.5	35-29- 42/0.25'	0.7	0.2 ppm	GW — Silty sandy GRAVEL; br. to red.— br.; 50% gravel variable mineral composition, ang. to submd.; 40% sand, fine to coarse grained, poorly sorted, subang, to submd.; 10% silt.	< 0710	GW	-
-40 -	40.0-41.5	38-50/0.4	1.0	0.2 ppm	— GC — Clayey sandy GRAVEL: br.; 40% gravel, ang. to submd.; 30% sand, fine to coarse grained, poorly sorted, subang, to submd.; 30% clay.	< 0720	GC	-
- 45 - -	45.0-46.5	22-50/0.3	0.5	0.2 ppm		< 0740	CL	
-50 -50	50.0-51.5	7-12-32	1.5	0.2 ppm	SP — SAND: red.—brown; 100% sand, mod. well sorted, subang. to subrnd. Mineral composition consists of quartz, feldspar, and ferromagnesium minerals.	< 0745	SP	
-55 -	55.0-56.5	5-7-8	1.5	0.2 ppm	- SP — Silty Clayey Sand: reddish brown color; 90% sand as above; 5% silt; 5% clay.	< 0810	SP	
-60	60.0-61.5	5-5-9	1.0	0.2 ppm	- SP — SAND: 100% sand, same as 50—55', trace of silt.	< 0820	SP	1 1 1 1
-65	65.0-66.5	5-8-14	1.5	0.2 ppm	-SP - SAND: 100% sand, same as 50-55' except coarse grained, med. to coarse sand.	< 0825	SP	
				[				1
70								7
NOTES	:							7
			21-220-01					

Pr	oject nam	e Goodyeg	Tire	& Rubber Co	Proje	ct No	03761-005-00		Borino	No. PB-28/
		Goodyear							Sheet	4 of 4
Dri	illing Firm.	Heber M	ining C	o.	Water Levels:	Depth	Elevation Time	/Date		lev
Dri	illing Meth	od Hollow S	tem A	uger	During Drilling	50.0'	0745/	5-15-91	Casino	Elev.
Но	llow-Stem	Auger O.D	. 8"	_l.D. <u>3 1/4"</u>	After Drilling	41.8'	5-1	5-91		Data <u>5/14/9</u> 1
					Well Level					Date5/15/91
Tot	tal Boring	Depth	106.5	ft.	Depth Measure	d Relative				d By Barner
SCALE	DEPTH	SAMPLE SPT BLOWS	DEC	DIO as	MATERIAL	DESCRIPTI	ON	T	ипн.	WELL
FEET	RANGE 105.0-	per 6 in. 8-12-10		OVA(1)				TIME	SECT.	CONSTRUCTION
-	106,5	8-12-10	1.0	0.2 S	P - As previous ilt (5%).	sample, stig	intly more		SP	
					Bottom of boring (	9 106.5 ft.				
-110										
-										1
-										
-				-						_
-				-						-
-115				-						_
-				l t						
										-
										-
-120										-
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-			4	-						
-				+						
-125			-	-						_
				-						-
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-130				L						1
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				-						
				-						]
				1						
135				-						
				+						-
				-						-
										+
140				-37						+
NOTES										

Pr	olect nam	e Coodina	Ties	a Pubb	Project No. 0770 con co				
1		Goodyea			er Co. Project No. 03761-005-00			NoPB-29	
								_1_ of _2_	
		Heber M						lev	
1		od Hollow S				-22-91	Casing Elev		
					3" After Drilling		Start	Date <u>5/22/9</u> 1	
					N/A Well Level		Finish	Date 5/22/91	
To	tal Boring	Depth	67.0	ft.	Depth Measured Relative To Grade		Logge	d By J. Moore	
SCALE	DEPTH	SAMPLE	Loca	T DID	MATERIAL DESCRIPTION		LITH.	WELL	
FEET		SPT BLOWS per 6 in.	REG.	OVA(1)	PASTERNAL OFFICIAL HOLA	TIME		CONSTRUCTION	
- 5 10 15	10.0-11.5	12-18-25	0.7	0.0 ppm	ML — Gravelly sandy SILT: red-br.; 70% silt, non-plastic, brittle, bedding plains visible; 20% sand, med. to mostly fine sands; 10% gravels, med. to fine, ang. to subrnd, poorly sorted; dry.	< 1118	3 ML		
- 20 - 20 	20.0-21.5 25.0-26.5	13-14-38 50/5°	0.3	0.0 ppm 0.0 ppm	— SW — Silty gravelly SANDS: red.—br.; 10% silt, non—plastic; 50% sand, coarse to fine grained, mostly med. sands; 40% gravels, coarse to fine, subang. to submd. poorly cemented, poorly sorted; dry.  — SW — Gravelly SAND: br.; 80% sand, coarse to fine sands, mostly med.grained; 20% gravels, coarse to fine gravels, v. angular to subang., poorly cemented "caliche", poorly	< 1130 < 1145			
-30 -30 -	30.0-31.5	50/4"	0.2	0.0 ppm	sorted; dry.	< 1153	GW	-	
NOTES	. « Grove	is Tirst obser	ved @	13 ft.	below grade.				

							3 (1711)	10 500
					Co. Project No. 03761-005-00		Boring	NoPB-29
		Goodyear					Sheet_	2 of 2
Dril	ling Firm	Heber Mi	ning (	Water Levels: <u>Depth</u> <u>Elevation</u> <u>Time/De</u>	ate	G.S. El	ev	
Dri	ling Metho	od Hollow S	tem A	uger	During Drilling45.0'1305/5-2	2-91		
Hol	low-Stem	Auger O.D.	. 8"	_1.D		- 1		Date 5/22/9
Rot	ary Bit Di	iaN/A_C	asina	Dia. N		_		Date5/22/91
		Depth				-		
							Logged	By J. Moore
SCALE IN	DEPTH	SAMPLE SPT BLOWS	REC.	PID or	MATERIAL DESCRIPTION	TIME	LITH.	WELL
FEET	RANGE 35.0-36.5	per 6 in.	0.7	OVA(1)			-	CONSTRUCTION
-	30.0	10-30/5	0.7	ppm	SW - Gravelly SAND: gray-br.; 95% sand, coarse to fine, mostly med. grained; 5% gravel, mostly fine, subang. to subrnd.; moist.	1207	SW	
-								
-40	40.0-41.5	27-50/2*	NR	NA	NO RECOVERY.	1305		
-						1000		
-								
-								
-								
-45	45.0-46.5	7-13-12	0.9	0.6	ML - Sandy gravelly SiLT: redbr.; 70% silt,	1316	ML	-
-				ppm	non-plastic to very low plasticity; 5% sand, coarse to fine sand; 25% gravels; med. to fine			
-					gravels, subrnd.; wet.			
		*						
-								
-50	50.0-51.5	18-20-26	1.2	0.0 ppm	ML - Sandy clayey SiLT: redbr.; 90% silt, non-plastic to very low plasticity; 5% clay;	1328	ML	-
					5% sand, fine-grained sand, micaceous, with black organic layers; moist to wet.			,
					block organic layers, moist to wet.			
_55	55 O 55 E	14-19-22	NO					
- 33	35.0-56.5	14-19-22	NK	NA	NO RECOVERY.	1340	NA	-
-60	60.0-61.5	50/4"	NR	NA	NO RECOVERY.			
						1353	NA	N. 7
						n trace		-
.			3		Bottom of boring 62.0 ft.			
.								
-65				-				
				-				
					No recovery (NR) NA - Not Available			_
	-			1				
70 NOTES:	1							
NO IES		se of poor i	ated (	9 62.0	ten foot of boring and problems with running sand	ds		

1					Co. Project No. 03761-005-00		Boring	NoPB-30	
	cation		Sheet 1 of 1						
		Heber Mi					G.S. Elev.		
		od Hollow S					Casing Elev		
					After Drilling		Start Date <u>5/22/9</u> 1		
		ia. N/A 0					Finish Date5/22/91		
Tot	tal Boring	Depth	29 /	26 ft.	Depth Measured Relative To Grade		Logge	d By <u>J. Moor</u> e	
SCALE IN FEET	DEPTH RANGE	SAMPLE SPT BLOWS per 6 in.	REC.	PID or OVA(1)	MATERIAL DESCRIPTION	TIME	LITH. SECT.	WELL CONSTRUCTION	
5 - 10	10.0-11.5	34-50/4"	0.4	0.0 ppm	ML — Sandy gravelly SILT: It. br.; 80% silt, brittle, "caliche type", non-plastic; 5% sand, mostly fine grained; 15% gravels, med. to mostly fine, subrnd. to subang., poorly	< 0857	ML		
- - -15 -					sorted, hard; dry.			-	
-20 - - -	20.0-21.5	50/4"	0.2	0.0 ppm	- GM - Sandy silty GRAVEL: gray br.; 15% silt, non-plastic; 10% sand, med. to mostly fine grained; 75% gravels, med. to mostly fine, ang. to subang., poorly sorted; dry.	< 0914	GM	_	
-25 - -	25.0-26.5	26-50/4"	0.4	0.0 ppm	-GM — Sandy silty GRAVEL: red—br.; 30% silt, non-piastic to v. low plasticity; 10% sand, coarse to fine sands, mostly med. sands; 60% gravels, coarse to fine, mostly fine gravels, subrnd. to subang., poorly sorted, streambed deposits; moist to dry.	< 0924	GM		
-30 - - - - 35					Bottom of boring @ 29.0 ft.			-	
NOTES	Drill	ler observed ehole location	gravel n was	offset 2	epth of 6.0 ft. Auger refusal observed at 26.0 5.0 ft. and redrilled. Auger refusal observed at	ft. 29.0 ft.			

Dri Dri Ho	lling Firm lling Metho llow—Stem tary Bit Di al Boring	Goodyean Heber Mi od Hollow S  Auger O.D. ia. N/A C	ning Contem Au Sasing 30 /	ger 1.0. 3" Dia. N/A 34 ft.	Site  Water Levels: Depth Elevation Time  During Drilling not observed  After Drilling  Well Level  Depth Measured Relative To Grade  MATERIAL DESCRIPTION	/Date	Sheet G.S. E Casing Start Finish Logger	NoPB-31 1 of 2 llev Date 5/22/91 Date 5/22/91 By J. Moore WELL CONSTRUCTION
- 5 - 10 - 15	10.0-11.5	28-21-30	0.6	ppm 5	AL/gM — Sandy gravelly SiLT: dull br.; 10% silt, non-plastic; 10% sand, coarse to ine, mostly med. sands; 40% gravels, coarse o fine, mostly fine, subrnd. to subang., gravels, poorly sorted; dry.	< 0600	ML/ GM	
-20	20.0-21.5	15-18-22	0.7	- u	W — Silty gravelly SAND: red br.; 5% silt, on—plastic; 65% sand, coarse to fine, mostly ned. sands, poorly cemented; 30% gravels, oarse to fine, very ang. to subang., poorly orted, dense; dry.	< 0615	sw	-
- 25	25.0-26.5	50/5"	0.7	ppm re	M — Sandy silty GRAVEL: gray-white to edbr.; 30% silt, non-plastic; 10% and, coarse to fine, mostly med. sands; 0% gravels, coarse to fine, mostly fine, ubang. to submd.; dry.	<0630	GM	
-30	30.0-31.5	37-50/4"	0.5	ppm si	M — Sandy silty GRAVEL: red.—br.; 20% lit; 15% sand, coarse to fine, mostly med. and seposits, coarse to fine, subang, to subrnd. ravels, poorly sorted; moist to dry.	<0643	GM	

					r Co. Project No. 03761-005-00		Boring	No. PB-31		
Lo	cation	Goodyea	, Arizo	ona – Po	GA Site		Sheet	2 of 2		
Drilling Firm Heber Mining Co. Water Levels: Depth Elevation Time/Date										
Dri	illing Metho	d Hollow S	tem A	uger	During Drillingnot observed			Elev		
					After Drilling			Date <u>5/22/91</u>		
					/A Well Level			Date5/22/91		
75.3		Depth								
				V-116	Depth medalied Keldtive 10 Grade		Logge	d By J. Moore		
SCALE	DEPTH	SAMPLE SPT BLOWS	TREC	I PID OF	MATERIAL DESCRIPTION	TIME	LITH.	WELL		
FEET	RANGE	per 6 in.		OVA(1)		TIME	SECT.	CONSTRUCTION		
-	34.0-35.5	50/3	0.1	0.4 ppm	SW — Gravel SAND: It. br.; 80% sand, "caliche", poor to moderate cementation, coarse to fine grained, mostly med. sands; 20% gravels, med. to mostly fine gravels, subang. to ang., dense; hard to dry to moist.	< 0719	SW			
40					Bottm of boring @ 34.0 ft.					
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70 NOTES:		and boring a	bandor efusal.	ned at a	depth of 34 ft. because of boulders/ cobbles a	nd grave				